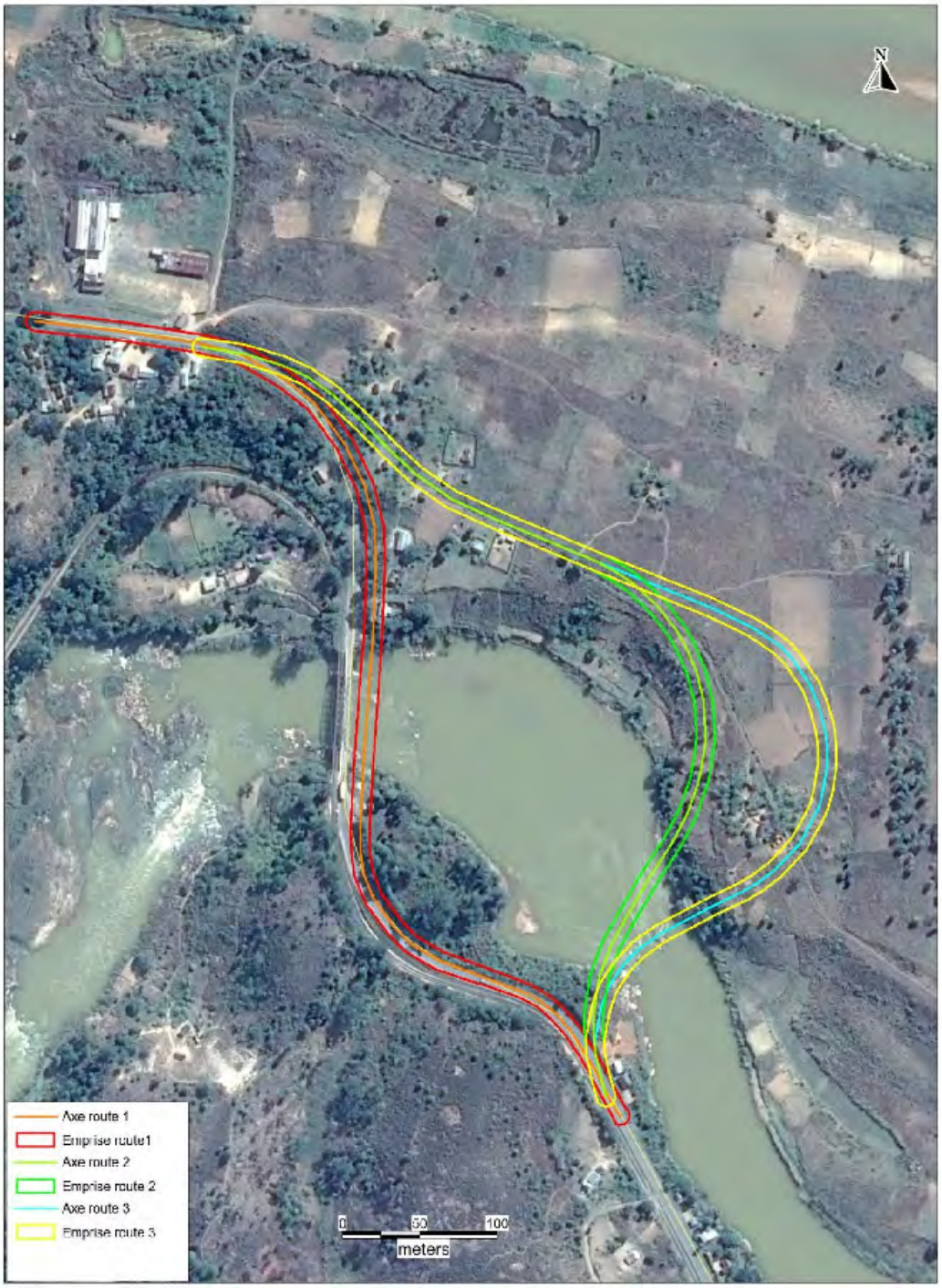
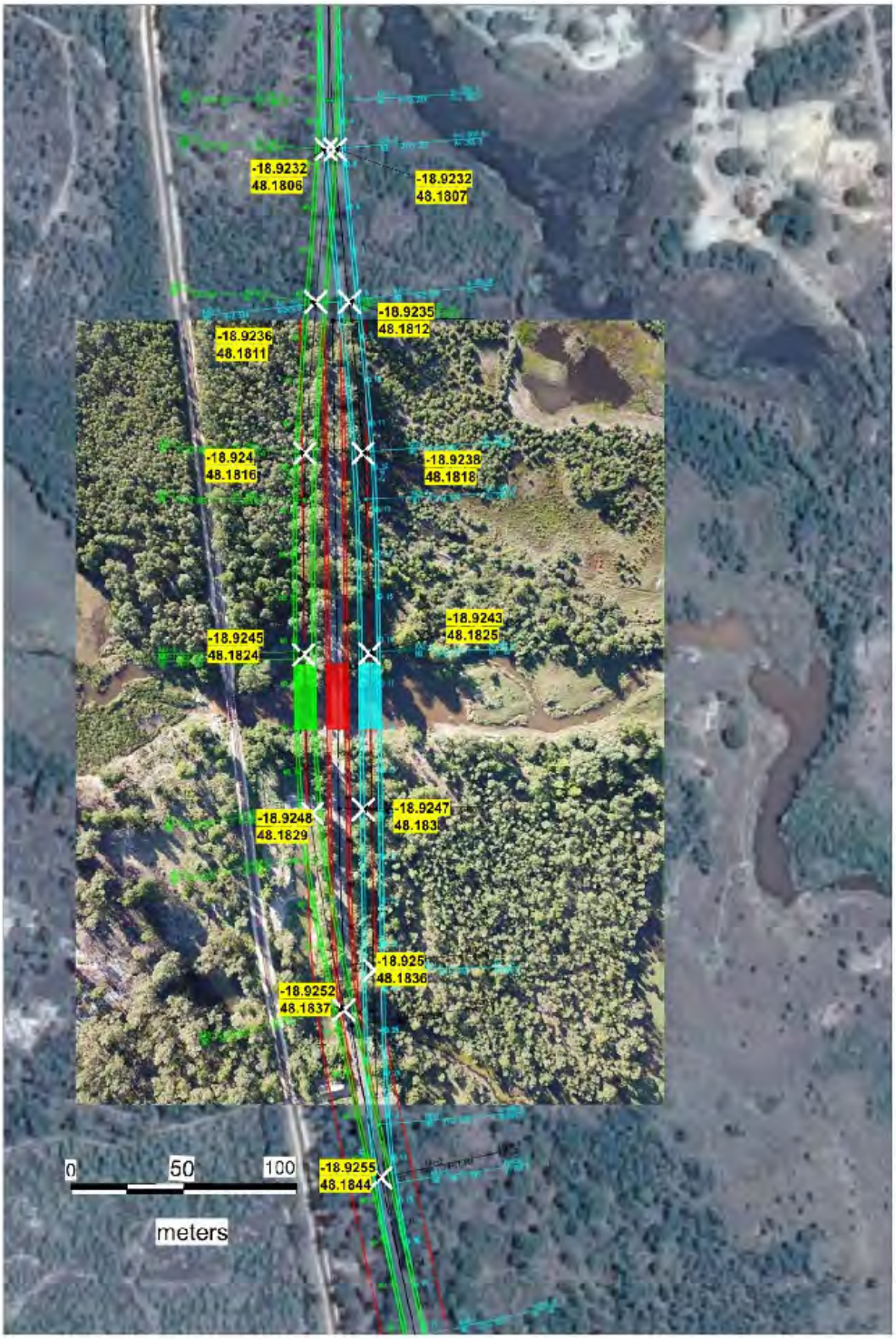
Annexure

ANNEX 1 : OPTIONS FOR THE MANGORO PROJECT



ANNEX 2 : OPTIONS FOR THE ANTSAPAZANA PROJECT



ANNEX 3 : DISTRICT ORDER

REPOBLIKAN'I MADAGASIKARA
Fitiavana - Tanindrazana - Fandrosoana

DISTRICT DE MORAMANGA

ARRETE N° 08/2018

Portant ouverture d'une enquête administrative de *commodo* et *incommodo* relative à l'acquisition à l'amiable ou par voie d'expropriation des diverses parcelles de terrain ou parties de parcelles de terrain nécessaires à la construction des deux nouveau ponts du Mangoro et d'Antsampazana.

LE CHEF DE DISTRICT DE MORAMANGA

Vu la Constitution;

Vu l'Ordonnance no.62-023 du 19 Septembre 1962 relative à l'expropriation pour cause d'utilité publique, à l'acquisition à l'amiable des propriétés immobilières pour l'Etat ou les Collectivités publiques secondaires et aux plus-values foncières, notamment en son article 4 ;

Vu la Loi no.2005-019 du 17 octobre 2005 fixant les statuts des terres à Madagascar,

Vu la Loi no.2006-031 du 24 novembre 2006 fixant le régime juridique de la propriété foncière privée non titrée,

Vu la Loi no.2008-014 du 23 Juillet 2008 sur le Domaine privé de l'Etat, des Collectivités Décentralisées et des personnes morales de Droit public, abrogeant les dispositions de la Loi no.60-004 du 15 Février 1960 sur le domaine privé national

Vu la loi no.2014 - 018 régissant les compétences, les modalités d'organisation et de fonctionnement des collectivités territoriales décentralisées, la gestion de leurs propres affaires ;

Vu le Décret no.64-399 du 24 septembre 1964 modifiant certaines dispositions du Décret no.63-030 du 16janvier 1963 fixant les modalités d'application de l'Ordonnance no.62-023 du 19 septembre 1962 ;

Vu le Décret no.2007-1109 du 18 décembre 2007 portant application de la loi N°2006-031 du 24 novembre 2006 fixant le régime juridique de la propriété foncière privée non titrée.

Vu le décret no.2017-078 du 2 Février 2017 portant nomination du Chef de District ;

Vu le Décret no.2018-529 du 4 Juin 2018 portant nomination du Premier Ministre, Chef du Gouvernement;

Vu le Décret no.2018 – 540 du 11 Juin 2018 portant nomination des membres du Gouvernement ;

ARRETE :

Article premier : Il est décidé l'ouverture d'une enquête administrative de *commodo* et *incommodo* relative à l'acquisition amiable ou par voie d'expropriation des diverses parcelles de terrain ou parties de parcelles de terrain nécessaires à la construction de deux nouveaux ponts, Mangoro et Antsampazana, au niveau des points kilométriques PK 94+200 (Commune rurale d'Ambohibary et Commune rurale d'Anosibe Ifody, District de Moramanga) et PK 105+460 (Commune rurale d'Ambohibary, District de Moramanga)

Article 2 : Le Chef du Service Régional des Domaines et le Chef du Service Régional de la Topographie de la Région Alaotra Mangoro à Moramanga, la Commune rurale d'Ambohibary, la Commune rurale d'Anosibe Ifody et les Chefs des Fokontany intéressés sont chargés, chacun en ce qui les concerne, de l'application du présent Arrêté qui sera publié au Journal officiel de République de Madagascar.

Moramanga, le 24 AOUT 2018

LE CHEF DE DISTRICT

DISTRICT MORAMANGA

LE CHEF DE DISTRICT
Par Délégation
L'ADJOINT

RAVELOMANJAKA
Attaché d'Administration, P.C.E. 3
Gendarmerie Nationale

Copie :

- *Monsieur le Ministre de la Décentralisation (pour compte-rendu)*
- *Monsieur le Chef de Région Alaotra Mangoro (pour compte-rendu)*

ANNEX 4 : UNIT PRICES FOR TREES / CROP LOSSES

REPOBLIKAN'I MADAGASIKARA

MINISTERE DE L'AGRICULTURE
ET DE L'ELEVAGE

SECRETARIAT GENERAL

DIRECTION REGIONALE DE L'AGRICULTURE ET DE L'ELEVAGE
ALAOTRA MANGORO

CIRCONSCRIPTION DE L'AGRICULTURE ET DE L'ELEVAGE
MORAMANGA

PRIX UNITAIRES DES ARBRES FRUITIERS JUSQU'A LA PREMIERE FRUITAISON ET D'AUTRES CULTURES (Ariary)

N° 99 /18- MINAE/SG/DRAE.51/CIRAE.MOR

PRODUITS	PU (Ariary)
Bananier	26000
Ananas	3500
Manguier	223000
Oranger	230000
Pamplemousse	120000
Pomme cannelle	123000
Pommier	153000
Corossolier	148000
Jacquier	148000
Kaki	225000
Caféier	220000
Caféier (Jeune plant)	14000
Tamarinier	126000
Avocatier	115000
Cocotier	160000
Grenadelle	47000
Haricot	6000000/Ha
Petit pois	6000000/Ha
Brèdes	50000/10m²
Choux	150000/10m²
Manioc	6000
Patate Douce	100000/are

Pomme de terre	120000/are
Riz	4200000/Ha
Pêcher	125000
Bibassier	80000
Goyavier	48000
Letchis	238000
Canne à sucre	240000/are
Jamblonnier	68000
Voatabia hazo	100000
Vigne	65000
Ravintsara	45000

Moramanga, le 22 Octobre 2018

Le Chef Circonscription de l'Agriculture
Et de l'Elevage

HARIMIANDRA Narindra

ANNEX 5 : MINUTES. PUBLIC CONSULTATIONS

Fitanana an-tsoratra ny fivoriam-pokonolona fampahafantarana ny Tetikasa Fanavaozana Tetezana amin'ny Lalam-bokatra Antananarivo – Toamasina ao amin'ny Repoblikan'i Madagasikara (Tetezan'Antsapazana)

Daty: 15 Augositra 2018
Toerana: Sampanana Analatsara, Fkt Andranokobaka
Fotoana: 10:50 – 11:50 maraina
Mpanatrika: Jereo amin'ny Taratasy Tovana 1 ny lisitr'ireo tonga nanatrika

1. Tanjon'ny fivoriana

Ny tanjon'ny fivoriana dia ny fampahafantarana sy fihainoana ny hevitrin'ny mponina mikasika ny fanavaozana ny letezan'Antsapazana, ny mety ho vokadratsiny amin'ny tontolo iainana ary ireo fepetra horaisina mba hanamaivanana izany. Nomena fanasana hanatrika ireo mpiara-miombonantoka sy ny mponina eo an-toerana. Nampahafantarina tamin'ny alalan'ny taratasy sy teny nampitaina tamin'ny Tompon'andraikitrin'ny Tanàna koa ireo mponina eo an-toerana (Fokontanin'Antsirinala, Analalava ary Ambohimanatrika).

Maherin'ny efapolo (40) ireo olona nanatrika ka anisan'izany ireo mponina eo an-toerana sy ireo Solontenan'ny Rafi-panjakana mahefa.

2. Fanokafana

Andriamatoa RATIARISOA Tafita Rubard, izay Lehiben'ny Sampan-draharaha misahana ny Rafitrasa Vaventy ao amin'ny Ministeran'ny Asa Vaventy sy ny Fotodrafitrasa, no nanokatra ny fivoriana tamin'ny fisarahabana ireo mpanatrika sy fanazavana fohifohy ny tanjon'ny Tetikasa sy ny fivoriana.

3. Famelabelarana

Nozarain'Andriamatoa RATIARISOA Tafita Rubard roa ny famelabelarana ilay Tetikasa: Ny tapany voalohany dia niompana tamin'ny fanazavana ny kisary sy soritsoritrin'ny Tetikasa, ary ny tapany faharoa kosa dia nifantoka tamin'ny filazana ireo mety ho vokadratsin'ny Tetikasa amin'ny tontolo iainana ary ireo tolokevitra sy fepetra horaisina mba hanamaivanana izany.

4. Fanontaniana/valiny

Taorian'ny famelabelarana dia nisy fotoana nametrahana sy namaliana fanontaniana izay voafehy ao anatin'ny tabilao hita etsy ambany. Na dia maro aza ireo fanontaniana sy fanehoan-kevitra, dia tsy nisy nanohitra ilay Tetikasa ireo mpanatrika rehefa voavaly avokoa izany.

5. Famaranana

Nofaranan'Andriamatoa RATIARISOA Tafita Rubard tamin'ny fisaorana ireo tonga nanatrika ny fotoana.

Famintinana ny fanontaniana/valiny

	Anarana/Andraikitra	Fanontaniana/Fanamarihana	Valiny
1	Ben'ny Tanânan'Ambohibary	➢ Fangatahana: a) Fanomezana asa ireo tanora eto an-toerana izany tsy an'asa ny ankamaroany; b) Fametrahana anatin'ny fotoana fohy araka izay azo atao "casseurs de vitesse" manamorona ny tetezana hampihenâna ny lozam-pifamohivohizana, indrindra amin'ny RN2 sy RN44; d) Tokony ho marina sy tsy hiangatra isika hanaovana fanadihadiana amin'ny filazam-pananana mba isorohana ny savorovoro eo amin'ny mpiaramonina sy mpiray lova; e) Ny 80 isanjaton'ny mponina dia tsy manana "titre", ka tsara ny fahafantarana hoe hodinihana koa ny momba azy ireo; ➢ Mirary soa mba hotanteraka soa aman-tsara ny Tetikasa.	➢ Eo am-pandinihana ny hanatsarana amin'ny ankapobeny ny RN2 ny Fitondrum-panjakana sy ny Ministeran'ny Asa Vaventy sy ny Fotodrafitrasa; ➢ Hampitaina amin'ny Sampandraharaham-Paritrin'ny Asa Vaventy sy ny Fototrafitrasa an Moramanga ilay fangatahana fametrahana "casseurs de vitesse" (Marihana anefa fa tsy mety intsony ilay karazany avo/lehibe ireny fa miteraka lozam-pifamohivohizana); ➢ Hodinihan'ny Kômisiônina avokoa ny tany rehetra na tsy misy kara-tany aza, eny fa na ny voninkazo maniry eo aminy aza; mila fantatrin'ny mponina koa anefa hoe tsy afaka mitaky na manao fanamburam-pananana fanampiny intsony izy rehefa nofarunana ilay lisitrin'ny fananananana honerana.
2	Lefitrin'ny Sefom-pokontanin'An tsirinala	➢ Misaotra ny Ministera sy ny JICA noho ny fivoriana; ➢ Matoky ny injinieran'ny Ministera izahay amin'ny famantarana izay vinavinan-dalana kely vokadratay indrindra; ➢ Ny ankamaroan'ny olona dia tsy manana tany "titrée" na "bornée"; ➢ Fangatahana: a) Tokony ho ny vokatrin'ny voly iray mifaneaisesy fa tsy indray mandeha ihany no tombanana; b) Tokony omena tombony amin'ny fanomezana asa ireo mponina eto an-toerana; ➢ Mety ho firy hekitara eoeo ny faritra ho potikin'ny Tetikasa; mety hahatratra 400Ha ve?	➢ Ny fananana rehetra voakasikin'ny tetikasa dia honerana avokoa rehefa avy nodinihan'ny Solontenan-drafiparijakana sy mponina mihoatra ny 10 (Afaka manome sosokevitra koa ianao amin'ny maha-solontenan'ny Fokontany anao); ➢ Ekena ilay fangatahana mikasika ny fanomezana asa ary mampanantena fa hahazo asa ny mponina eto an-toerana; ➢ Mety tsy ho 400Ha no ho voakitika, saingy tsy tokony hifankaiza amin'ny haben'ny tetezana/lalana (9-12 metatra eoeo).
3	Mponina nandray fitenenana voalohany	➢ Firy metatra eo ho eo ny faritr'ilay Tetikasa? Mety ho tonga hatrety an-tanàna (Analatsara) ve?	➢ Mbola hodinihina sy hofaritana amin'ny "piquet" ny faritra voaksaikin'ny Tetikasa.
4			➢ Mila azon'ny tsirairay avy fa anjaran'ny Orinasa no manome asa fa tsy ny Ministera; tokony hianatra asa isika raha te hahazo asa tahaka ny tamin'ny Tetikasa Ambatovy; ➢ Ny faritra ambanin'ny tetezana dia an'ny "privée" fa ny faritra ambonin'ny tetezana dia niverina ho fananan'ny Province.

5	Mponina nandray fitenenana faharoa	➤ Mety rahoviana no hanomboka ny asa satria ny ankamaroanay eto dia vahiny (avy any Toamasina, Antsirabe, sns) fa io varotra saribao io avokoa no nihavianay teto?	➤ Mety afaka herintaona eo ho eo ny asa no hanomboka: hampahafantarina mialoha ianareo ary hofantatraroo koa hoe hanomboka tsy ho ela ny asa rehefa mahita bildôzera sy "engins" maromaro ianareo; ➤ Hanomboka tsy ho ela kosa anefa ny fanadihadiana mikasika ny tontolo iainana sy ny sôsialy

Le MAIRE DE LA COMMUNE
SOLOTRAITS
AMBOHIBARY

FANANTENAHADERA Nomena

Fitanana an-tsoratra ny fivoriam-pokonolona fampahafantarana ny Tetikasa Fanavaozana Tetezana amin'ny Lalam-bokatra Antananarivo－Toamasina ao amin'ny Repoblikan'i Madagasikara (Tetezan'i Mangoro)

Daty: 16 Aogositra 2018
Toerana: Antanjona, Fkt Ankarefo
Fotoana: 2:50 – 4:30 folakandro
Mpanatrika: Jereo amin'ny Taratasy Tovana 1 ny lisitr'ireo tonga nanatrika

1. Tanjon'ny fivoriana

Ny tanjon'ny fivoriana dia ny fampahafantarana sy fihainoana ny hevitrin'ny mponina mikasika ny fanavaozana ny tetezan'i Mangoro, ny mety ho vokadratsiny amin'ny tontolo iainana ary ireo fepetra horaisina mba hanamaivanana izany. Nomena fanasana hanatrika ireo mpiara-miombon'antoka sy ny mponina eo an-toerana. Hita ao amin'ny Taratasy Tovana 1 ny lisitr'ireo mpiara-miombonantoka. Nampahafantarina tamin'ny alalan'ny taratasy sy teny nampitaina tamin'ny Tompon'andraikitrin'ny Tanàna koa ireo mponina eo an-toerana (Fokontanin'Ankarefo sy Ankarahara).

Miisa fitopolo (70) eoeo ireo olona nanatrika ka anisan'izany ireo mponina eo an-toerana sy ireo Solontenan'ny Rafi-panjakana mahefa.

2. Fanokafana

Andriamatoa RATIARISOA Tafita Rubard, izay Lehiben'ny Sampan-draharaha misahana ny Rafitrasa Vaventy ao amin'ny Ministeran'ny Asa Vaventy sy ny Fotodrafitrasa, no nanokatra ny fivoriana tamin'ny fiarahabana ireo mpanatrika sy fanazavana fohifohy ny tanjon'ny Tetikasa sy ny fivoriana.

3. Famelabelarana

Nozarain'Andriamatoa RATIARISOA Tafita Rubard roa ny famelabelarana ilay Tetikasa: Ny tapany voalohany dia niompana tamin'ny fanazavana ny kisary sy soritsoritrin'ny Tetikasa. Ny tapany faharoa kosa dia niompana tamin'ny filazana ireo mety ho vokadratsin'ny Tetikasa amin'ny tontolo iainana ary ireo tolokevitra sy fepetra horaisina mba hanamaivanana izany.

4. Fanontaniana/valiny

Taorian'ny famelabelarana dia nisy fotoana nametrahana sy namaliana fanontaniana izay voafehy amatin'ny tahilao hita etsy ambany. Na dia maro aza ireo fanontaniana sy fanehoan-kevitra, dia tsy nisy nanohitra ilay Tetikasa ireo mpanatrika rehefa voavaly avokoa izany.

5. Famaranana

Nofaranan'Andriamatoa RATIARISOA Tafita Rubard tamin'ny fisaorana ireo mpandray anjara ny fotoana.

Famintinana ireo fanontaniana/valiny

	Anarana/Andraikitra	Fanontaniana/Fanamarihana	Valiny
1	Ben'ny Tanànan'Anosibe Ifody	➢ Ahoana ny mikasika fitadiavan'ireo olona manana varotra madinidinika?	➢ Jereo ny "Fomba fanonerana" faha-2: hatao fanadihadiana avokoa ny zava-drehetra (nofon-tany, tany, trano, rano, sns.); ➢ Amporisihana ny mponina hilaza izay hetahetany/manahirana azy amin'ireo Mpanadihady ny tontolo lainana/fiarahamonina satria homena lanja alohan'ny fananany, ny asa fivelomany, ary ny fifandraisany amin'ny làlana, rano, tetezana, sns ny olombelona. ➢ Ireo Mpanadihady dia hanolotra vahaolana mikasika ireo vokadratsin'ny Tetikasa izay hodinihan'ny Kômisiônina avy eo; ny mponina koa dia afaka manome sosokevitra mikasika ireo vinavinan-dalan'ny Tetikasa ireo.
2	Sefom-Pokontanin'An karahara	➢ Manao ahoana ny resaka asa ho an'ny tanora?	➢ Mety afaka herintaona no manomboka ny asa (rehefa mifarana ny fanadihadiana); ➢ Hisy fandraisana mpiasa hataon'ny orinasa japone; ➢ Ny eo an-toerana no hahazo asa voalohany izay vao ny olona ivelany rehefa tsy hita eo an-toerana ilay fahaizana/traikefa ilaina (toy ny mpamily "niveleuse").
3	Mponina nandray fitenenana voalohany	➢ Ahoana ny fomba fanonerana ireo tany tsy "titrée/bornée" maintimolaly na solam-pangady?	➢ Voasokajy ho karazan'ny roa ny tany: Ny tany misy kara-tany sy ny tsy misy; ny tany misy kara-tany dia tsy maintsy hovoaonitra (mila manao acte de notoriété raha mpanduva); ny tany tsy misy kara-tany kosa dia hodinihan'ilay Kômisiônina izay andraisan'ny Ben'ny Tanàna sy ny Sefom-Pokontany anjara; ➢ Tsy afaka ny handà ny fanapahan-kevitrin'ny Kômisiônina ny Fanjakàna.
4	Ben'ny Tanànan'Ambohibary	➢ Aoka tsy hiteraka disadisa eo amin'ny mpiara-monina io resaka fanonerana sy fanadihadiana io (tokony ho marina isika voakasika ary hifampitsinjo ny mpiray lova).	-
5	Mponina nandray fitenenana faharoa	➢ Izaho manana tany "titrée" eo akaikin'ny tetezana; tsy maintsy hafindra ka ho lavitran'ny tsena mahazatra izany ny tranoko?	➢ Mampahatsiahy ilay fanonerana arakarakan'ny sokajin-tany voalaza teo aloha.
6	Mponina nandray fitenenana fahatelo	➢ Nahazo tatitra fahasimbana akaikin'ny tetezana sahady izahay (akondro sy zavoka tapaka) nefa mbola tsy manomboka akory ny asa; manahy ny mikasika ny fandotoana rano (mety haterakin'ny asa fandavahana lalina amin'ny masinina) ny mponina izay amin'ny Mangoro	➢ Tokony hanantona an'i Mr Roger (Chef de village) izay rehetra simba fananana noho ny asa fandavahana ataon'ny Colas, dia mijery izay fomba hifanarahana (ohatra: Dina) raha ilaina; ➢ Fanazavana ny anton'ilay asa fandavahana ataon'ny Colas (Fizahana ny faritra mafy ambanin'ny tany ifaharan'ny fotoiry ny tetezana, ary ireo "piquets"

	Anarana/Andraikitra	Fanontaniana/Fanamarihana	Valiny
		avokoa no maka rano fisotro, ka apetrakay eo am-pelan-tànan' ireo Mpanadihady ny tontolo iainana izay.	apetrany dia tsy mbola famaritana ny faritry ny Tetikasa fa fitaovam-piasana fotsiny ihany) ary fialan-tsiny noho izany fanembantsembanana izany sahady (antony: fohy dia fohy ny fotoana ahafahan'ny teknisianina japone mipetraka eto Madagasikara); ➢ Anisan'ireo zavatra hozahavan'ireo Mpanadihady ny tontolo iainana ny mikasika ny rano; afaka manome sosokevitra azy ireo koa ianareo mikasika ny fatsakana solony (Ohatra: lava-drano) na zavatra hafa fa tsy maintsy misy ny vahaolana: ➢ Ohatra tetikasa fanamboaran-tetezana japone iray hafa any Toamasina izay nahazoan'ny mponina lava-drano nefa niteraka savorovoro/tsy fifanajana (Izay tsara sorohina amin'ny alalan'ny fitsipika sy fitantanana mazava sy hentitra).
7	Mponina nandray fitenenana fahaefatra	➢ Efa fantatra ve hoe iza ilay asa atao? Hampahafantarina mialoha ny fiantombohan'ny asa ve izahay?	➢ Mbola eo am-pampitahana ireo vinavinan-dàlana telo izahay saingy afaka manome sosokevitra ny Ministera/JICA koa ianareo mponina; ➢ Mety haharitra andro maromaro ny fanadihadiana; hampahafantarina mialoha ary hatonin'ny Mpanao fanadihadiana tsirairay ianareo (Ny Sefom-pokontany/fokonolona no hananarina ireo fananana ary hotombanana amin'ny antsipirihany avokoa ny fananan'ny tsirairay avy).
8	Mponina nandray fitenenana fahadimy	➢ Ahoana ny resaka rano raha toa ka ilay làlana voalohany (Plan A) no voafidy? ➢ Maniry ny mba hampahafantarina faran'izay mialoha indrindra izahay mba hisorohana ny disadisa (mikasika ny fandraisana ilay vola fanonerana sy ny fotoana hifindrana: herintaona eoeo vao mahavita trano ritso-peta iray); ➢ Raha toa ka ilay voalohany (Plan A) no lany, dia tokony ho trano biriky no hasolo ny tranonay satria ny hazo dia sarotra dia sarotra ety; ➢ Nahare izahay hoe hamono omby ianareo alohan'ny hanombohan'ny asa, izay tokony hotanterahana fa tsy hijanona ho honohono fotsiny (zava-dehibe ny resaka finoana).	➢ Ny vato fehizoro dia matetika apetraka telo na efa-bolana alohan'ny fiantombohan'ny asa; ➢ Ny filoham-pirenena dia manome omby roa ny mponina foana rehefa amin'ny fotoana toy ireny (Tahaka ny tany Ambohidratrimo, avaratr'Antananarivo), saingy anjaran'ny vahoaka indray no misafidy izay tiany anaovana azy ireo (vonoina atao joro, amidy, sns); ➢ Ho azonáreo alohan'ny fiantombohan'ny asa ny volanareo; ➢ Miankina amin'ny tombantombam'ny Kômisiônina ny fanonerana ny trano biriky, nefa raha ny tokony ho izy dia ny sandan'ilay trano araka ny endriny ihany no hanonerana ireo voakasika (Ritso-peta = tombam-bidin'ny ritso-peta no azo; tahaka izay koa ny trano biriky na tanimanga); vola no hanonerana ireo tompom-pananana, ka anjaran'izy ireo indray avy eo no misafidy izay tiany hanaovana ilay vola (hananganana trano vaovao na hividianana omby, sns); ➢ Ny vidin-javatra ankehitriny no hanombanana ireo fananana (ny Ben'ny

	Anarana/Andraikitra	Fanontaniana/Fanamarihana	Valiny
			Tanàna izao mahalala hoe ohatrinona no mahavita trano ritso-peta iray).
9	Mponina nandray fitenenana fahaenina	➢ Tokony hanana faharetana sy hahay hifanerasera amin'ny ireo mponina anaovany fanadihadiana/tombantombana ilay Kômisiônina satria mety tsy hifankahazo ny resaka indraindray; ➢ Hataonareo in-dray na in-droa na in-telo manome ve ilay vola fanonerana mba hahafahanay manomana ny fifindrana?	➢ Horaisin'ireo Mpanao fanadihadiana an-tsoratra avokoa ny fanontanianareo/sosokevitrareo (Mampahafantatra ireo avy ao amin'ny Cabinet SMC), izay hanao tatitra amin'ilay Kômisiônina (Ka tokony holazainareo aminy avokoa izay manahirana anareo), fa tsy hifankahita mivantana amin'ilay Kômisiônina ianareo; azonareo atao koa ny miresaka amin'ny Ben'ny Tanànanareo raha misy zavatra fanampiny tianareo holazaina.
10	Sefom-pokontanin'An karefo	➢ Ny fomban-tany dia mitaky ny famonoana omby alohan'ny fanombohana ny asa (Ankoatran'ny fety fametrahana vato fehizoro)	-

FITANANA AN-TSORATRA

Daty: 20 oktobra 2018.

Toerana: Atanjona Atsinanana.

Natao androany roapolo Oktobra 2018 ny fihaonana niaraka amin'ireo Fokontany efatra mikasika ny tetikasa fanamboarana tetezana vaovao (Antanimpazana, Mangoro). Ny tanjon'ny fivoriana ny fanomezana fanazavana ny fikajiana ny tambin'ny onin'ny fanjakana amin'ireo fananana voadona.

Nohazavaina tamin'izany:

- ny fikajiana ireo fananana voadona = voankazo fihinam-boa, karazan-kazo, voly isan-karazany.

Ny tambiny izay atolotry ny fanjakana dia mifanandrify amin'ny tomban-tidy izay avoakan'ny sampan-draharaham-panjakana.

Ny voly dia ny sampan-draharahan'ny fambolena, ny kazo sampan-draharahan'ny ala ary ny tany dia ny sampan-draharahan'ny fananan-tany.

Voalaza tamin'izany koa fa tambiny ara-bola no hatolotra ny tompony ary ny hatolotra volana vitsivitsy mialoha mba ahafahan'ny tompony ary miomana indrindra ireo mananan-tany horavaina.

Rehefa vita ny fanazavana nisoso tamin'ny ady hevitra ny mpanatrika anjara.

Fanontaniana sy soso-kevitra

1- Azo omipaiziana ve amin'ny tomban-tidy ny kazo fihinamboa ny fotoantoka mandrapahazo vokatra.

FOKONTANY ANKAREFO

1

Valiny : Efa tafiditra ao anaty fikajiana ny tombam-bidy daholo izany

2- Ahoana no ikarakara ny tany manana karatany sy tany izay irta fanamarinana molaly?

Valiny : Raha tafiditra ao anatin'ny velaran'ny lalam-pirenena 30 m dia tsy misy tambiny ny fanamarinana molaly.

Raha any ivelan'io 30 m ka misy karatany na kadasitra dia misy tambina-bidy avoakan'ny fananan-tany.

Raha ivelan'io fa fanamarinana molaly dia kely kokoa ny tambin'ny omen'ny fanjakana satria misy vidiny ny fanamboarana ny karatany.

3- Tsara raha omena fotoana mialoha sy mala-ladalaka ny olona.

Valiny : Voalaza avokoa ny tambiny aloan'ny fanjakana sao hanomboka ny asa.

Ary tsy hanomboka ato ho ato ny tetikasa fa any amin'ny faraparan'ny taona 2019 farafahain-gany.

Omena fotoana 4 na 5 volana ny tsirairay mba hiomanany.

Rehefa vita ny kajikajy ny tombam-bidy ny fananana izay voakitika ary lalaovina no homena ny tsirairay. Tsy hisy olona hanao voly vaovao intsony.

Nomen'ny mpandray anjara fahefana ny filohan-fokontany mba hanao sonia ity fitanana an-taratasy ity.

Natao peta-drindrina ny lisitry ny olona voakasika mba hita ary ny boky sy sary tany hapetraka ao amin'ny fokontany.

FOKONTANY ANKAREFO

CEFO FOKONTANY

...TODISOA Celestin

CHEF DE FOKONTANY

RAZAFINDRAMA... Marthe

2

FICHE DE PRESENCE

N°	Anarana	Asa	Adiresy / Telefonina	Sonia
1		mpamboly	Antanjona	
2		mpamboly.	Antanjona	
3		Chef de village	Antanjona.	
4		mpamboly	Atajona	
5		Mpamboly	Antanjona	
6		Mpamboly	Antanjona.	Za
7		Mpamboly	Antanjona	Berthine
8		Mpamboly	Atanjona	
9		Mpivarotra	Atanjona	
10		Chef de FKT Ankarefo		
11		Chef FKT Ambonilava		
12		MPAMBOLY		
13		Mpamboly		Rafanoeline
14		Mpanadihady		
	ANKAREFO ANDRIATODISOA Celestin	MORAMANGA	CHEF DE FOKONTANY ILAVA RAZAFINDRAMANANA Martine Commandeur de l'Ordre National	

ANNEX 6 : MANGORO PROJECT – LOSS OF CROPS / TIMBER TREES

PAPs Code	Champs	Nombre de pieds	Arbres et Cultures
MA1			
MA2	Bananier	20	520 000
	Ananas	46	161 000
	Pêcher	7	875 000
	Orange	5	1 150 000
	canne a sucre	10	2 400 000
	goyave	1	48 000
	Bibasse	3	240 000
	Ravintsara	1	45 000
	Manioc	10	60 000
	Patate	10	10 000
MA3	Bananier	8	208 000
MA4	Manguier	5	1 115 000
	Oranger	3	690 000
	Canne à sucre	7	84 000
	Letchis	1	238 000
	Grenadelle	1	47 000
	Bananier	10	260 000
	Bibassier	2	160 000
	Acacia	1	15 000
	Letchis	1	238 000
MA5	Champs de haricot	Surface	60 000
	bananiers	6	156 000
	canne a sucre	3	7 200
	pêcher	2	250 000
MA6	champs de manioc	Surface	270 000
	bibassier	1	80 000
	pêcher	4	500 000
MA7	bananier	16	416 000
	avocatier	3	345 000
	manguier	4	892 000
	oranger	4	920 000
	voatabia hazo	3	300 000
	pêcher	4	500 000
	bibassier	3	240 000
	kaki	2	450 000
	ananas	20	70 000
	jamblon	6	408 000
	tamarinier	1	126 000

PAPs Code	Champs	Nombre de pieds	Arbres et Cultures
	Mandarinier	2	460 000
	Oviala	4	24 000
	ravintsara	5	225 000
MA8	avocatier	2	230 000
	pêchier	5	625 000
	pamplemousse	6	720 000
	jamblonnier	2	136 000
	manguier	1	223 000
	cafeir	1	220 000
	corrossol	2	440 000
	kaki	1	225 000
	bananier	9	234 000
	Voatabiahazo	2	200 000
MA9	cyprès	116	696 000
	eucalyptus	44	792 000
	ravintsara	7	315 000
MA10			
MA11			

ANNEX 7 : PROPOSED DUP DECREE

REPOBLIKAN'I MADAGASIKARA
Fitiavana - Tanindrazana - Fandrosoana
****

NOTE DE PRESENTATION
****

CONTEXTE

La Route nationale 2 (RN2) reliant Toamasina et Antananarivo constitue un enjeu économique majeur, abstraction faite des autres aspects tout aussi importants. En effet, la majeure partie des échanges économiques nationaux en est tributaire. Cependant, mis à part les éboulements et autres dégradations récurrentes de ladite route, certains ponts constituent également des facteurs de blocage.

Afin d'assurer une meilleure fluidité du trafic (lourd et léger) sur cet axe, le Gouvernement malagasy a alors obtenu un financement de la JICA en vue de construire 2 nouveaux ponts au niveau des rivières Mangoro (PK94+200) et Antsapazana (PK105+460)

Des études technicoéconomiques ont ainsi été réalisées et ont abouti à plusieurs options pour les 2 ponts. Toutefois, du fait de l'occupation du voisinage des zones de construction, les options proposées empiètent sur des biens privés (maisons, champs, autres). Aussi, en vertu des dispositions de la législation nationale et des exigences de la JICA, la préparation d'un Plan de réinstallation s'avère requise.

Dans ce cadre, toute personne qui sera expropriée ou déplacée contre son gré ou dont les sources de revenu seront affectées devra être compensée d'une manière équitable.

Comme des parcelles titrées seront impactées, une procédure d'acquisition de terrains est nécessaire : en vertu des dispositions de l'Ordonnance 62.023, un décret y afférent devra donc être pris.

ENVERGURE DE L'ACQUISITION DE TERRAINS

Les types d'impact identifiés sont regroupés dans le tableau suivant :

Localité	Exigences techniques	Nombre de ménages affectés	Type d'impact	Statut foncier
Pont Mangoro	Emprise : 2*15m (selon les dispositions de l'Ordonnance 60.166)	11	• Perte de toute ou partie de champs de culture • Pertes de plants d'arbre • Pertes de maisons d'habitation / commerce	• 2 parcelles titrées • Toutes les autres occupations sont de type "traditionnel"
Pont Antsapazana	Emprise : 2*15m (selon les dispositions de l'Ordonnance 60.166)	4	• Perte de toute ou partie de champs de culture • Pertes de plants d'arbre	• 2 parcelles titrées • 2 autres propriétés privées non titrées

Notes :

(a) En matière de compensation, les Politiques environnementales et sociales de la JICA exigent que les occupations traditionnelles soient indemnisées d'une manière équitable afin d'éviter un appauvrissement des ménages impactés.

(b) Pour le cas d'Antsapazana, une partie des terrains sera occupée d'une manière temporaire pour les besoins de la déviation pour environ 16 mois. Par contre, les partes d'arbres et de cultures y afférentes seront compensées.

DEMARCHES DEJA REALISEES

Les procédures suivantes ont déjà été réalisées :

- Un Arrêté d'ouverture des enquêtes de *commodo* et *incommodo* a déjà été pris par le Chef de District.
- Tous les ménages impactés ont déjà été identifiés
- La liste des ménages impactés a déjà été affichée au niveau des Communes/Fokontany concernés.
- La date limite d'éligibilité a déjà été fixée.

Tous les ménages impactés ont déjà consultés et acceptent de céder les parcelles nécessaires à l'Etat.

Tel est, Son Excellence Monsieur le Premier Ministre, Mesdames et Messieurs les Membres du Gouvernement, l'objet du présent projet de Décret que nous avons, respectueusement, l'honneur de vous soumettre.

Le Ministre de l'Aménagement du Territoire, de l'Habitat et des Travaux Publics

Hajo ANDRIANAINARIVELO

REPOBLIKAN'I MADAGASIKARA
Fitiavana - Tanindrazana - Fandrosoana
****

Ministère des Travaux Publics et des Infrastructures

DECRET N°2019 - .....

déclarant d'utilité publique et classant dans le domaine public les bandes / parcelles de terrain nécessaires à la construction de deux nouveaux ponts sur la rivière Mangoro et à Antsapazana

LE PREMIER MINISTRE, CHEF DU GOUVERNEMENT

Vu la Constitution ;

Vu la loi cadre n°2005-019 du 17 Octobre 2005 fixant les principes régissant les statuts des terres

Vu la loi n°2008-014 du 23 juillet 2008 sur le Domaine privé de l'Etat

Vu le décret n°2010 -233 portant application de la loi 2008-14

Vu la loi n° 2008 -013 du 23 juillet 2008 sur le domaine public

Vu le décret n°2008-1141 du 01 Décembre 2008 portant application de la loi 2008-013

Vu l'Ordonnance n°60-099 du 21 Septembre 1960 réglementant le domaine public;

Vu l'Ordonnance n°60-167 du 03 Octobre 1960 relative à l'Urbanisme;

Vu l'ordonnance n° 74-021 du 20 Juin 1974 portant refonte de l'ordonnance 62-110 du 1er octobre 1962 sanctionnant l'abus de droit de propriété et prononçant le transfert à l'Etat des propriétés non exploitées

Vu l'Ordonnance n°62-023 du 19 Septembre 1962 relative à l'acquisition amiable ou par voie d'expropriation pour cause d'utilité publique des propriétés privées au profit de l'Etat;

Vu le Décret n°63-030 du 16 Janvier 1963 fixant les modalités d'application d'Ordonnance n°62-023 du 19 Septembre 1962 susvisée ;

Vu la Loi n° 2015-052 du 3 février 2016 relative à l'Urbanisme et à l'Habitat;

Vu le Décret n°64-205 du 21 Mai 1964 fixant les modalités d'application de la Loi n°60-004 du 15 Février 1960 sus visée;

Vu le Décret n°64-291 du 22 Juillet 1964 fixant les règles relatives à la délimitation, l'utilisation, la conservation et la police du domaine public;

Vu le Décret n°64-399 du 24 Septembre 1964 modifiant certaines dispositions du Décret n°63-030 du 16 Janvier 1963 sus visé;

Vu le Décret n°2019-016 du 21 Janvier 2019 portant nomination du Premier Ministre, Chef du Gouvernement ;

Vu le Décret n°2019-026 du 24 Janvier 2019 portant nomination des Membres du Gouvernement ;

Sur proposition du Ministre de l'Aménagement du Territoire, de l'Habitat et des Travaux Publics

en Conseil du Gouvernement

DECRETE

Article premier : Est déclarée d'utilité publique les bandes ou parcelles de terrain d'environ zéro virgule cinq hectare situées dans la nouvelle emprise de la Route Nationale 2 au niveau du Pont de Mangoro et du Pont d'Antsapazana, Région ALAOTRA-MANGORO.

Article 2: A défaut d'accord amiable, est frappée d'expropriation pour cause d'utilité publique dans les conditions prévues par l'Ordonnance n°62-023 du 19 Septembre 1962 sus visée, les parties des parcelles se trouvant à l'intérieur du Plan annexé au présent Décret.

Article 3 : Le présent Décret constitue acte de cessibilité de la propriété désignée à l'Article 2 ci-dessus et, en particulier, soumet ladite propriété aux servitudes imposées à l'Article 8 de l'Ordonnance 62-023 du 19 Septembre 1962.

Article 4 : L'ensemble du domaine délimité sur les plans ci-annexés, d'une superficie d'environ un demi-hectare est intégré dans le domaine public de l'Etat.

Article 5 : En l'absence d'accord à l'amiable, ce décret vaut acte de cession.

Article 6 : Le Ministre des Finances et du Budget, le Ministre de l'Intérieur et de la Décentralisation, le Garde des Sceaux, Ministre de la Justice, le Ministre de l'Aménagement du Territoire et des Services Fonciers, le Ministre de l'Agriculture et de l'Élevage, le Ministre des Travaux Publics et des Infrastructures sont chargés,, chacun en ce qui le concerne, de l'exécution du présent Décret qui sera publié au Journal Officiel de République de Madagasikara.

Fait à Antananarivo, le 2017

LE PREMIER MINISTRE
Chef du Gouvernement

NTSAY Christian

Le Ministre de l'Intérieur et de la Décentralisation

Richard RANDRIAMANDRATO

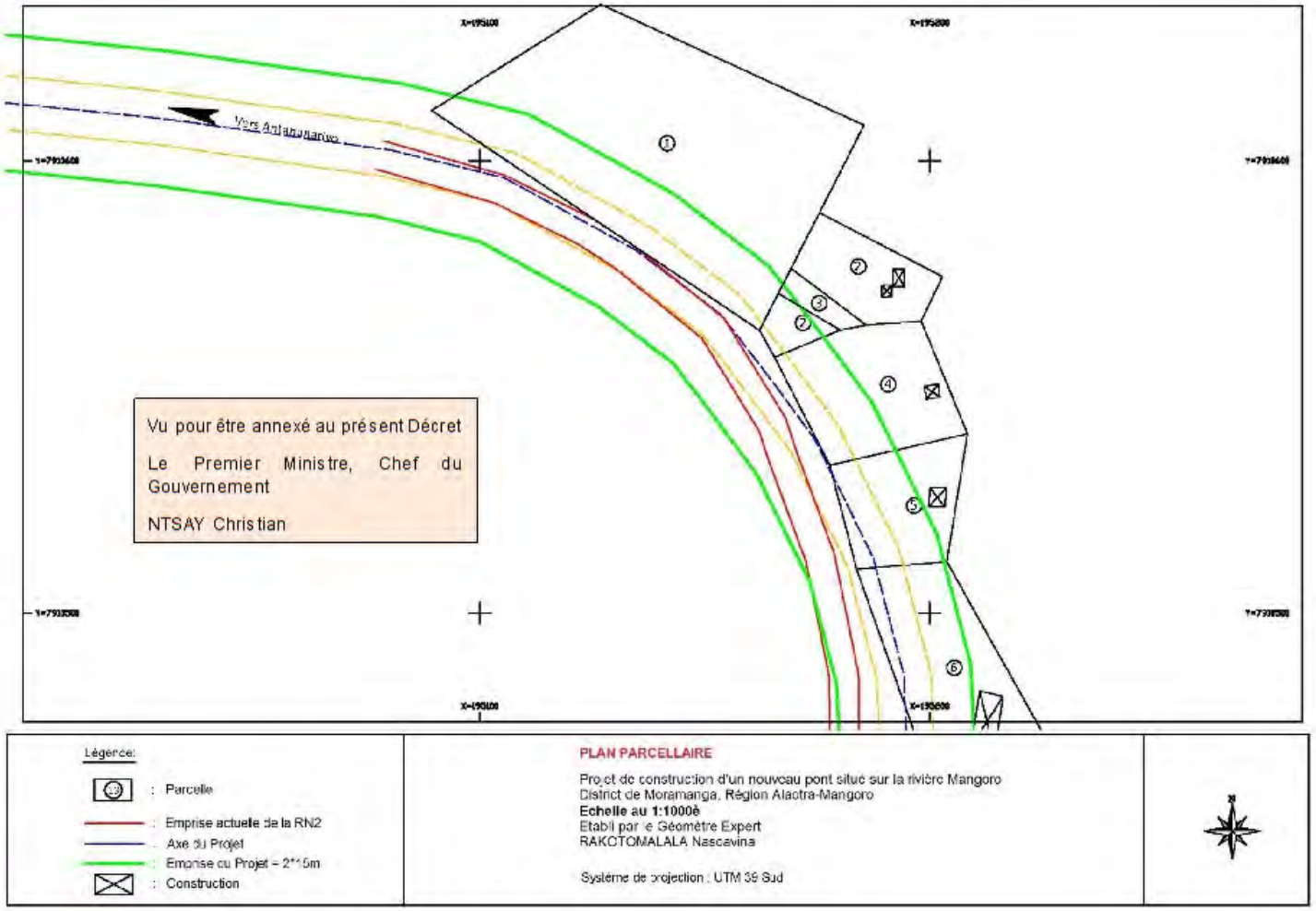
Le Ministre de l'Agriculture, de l'Elevage et de la Pêche

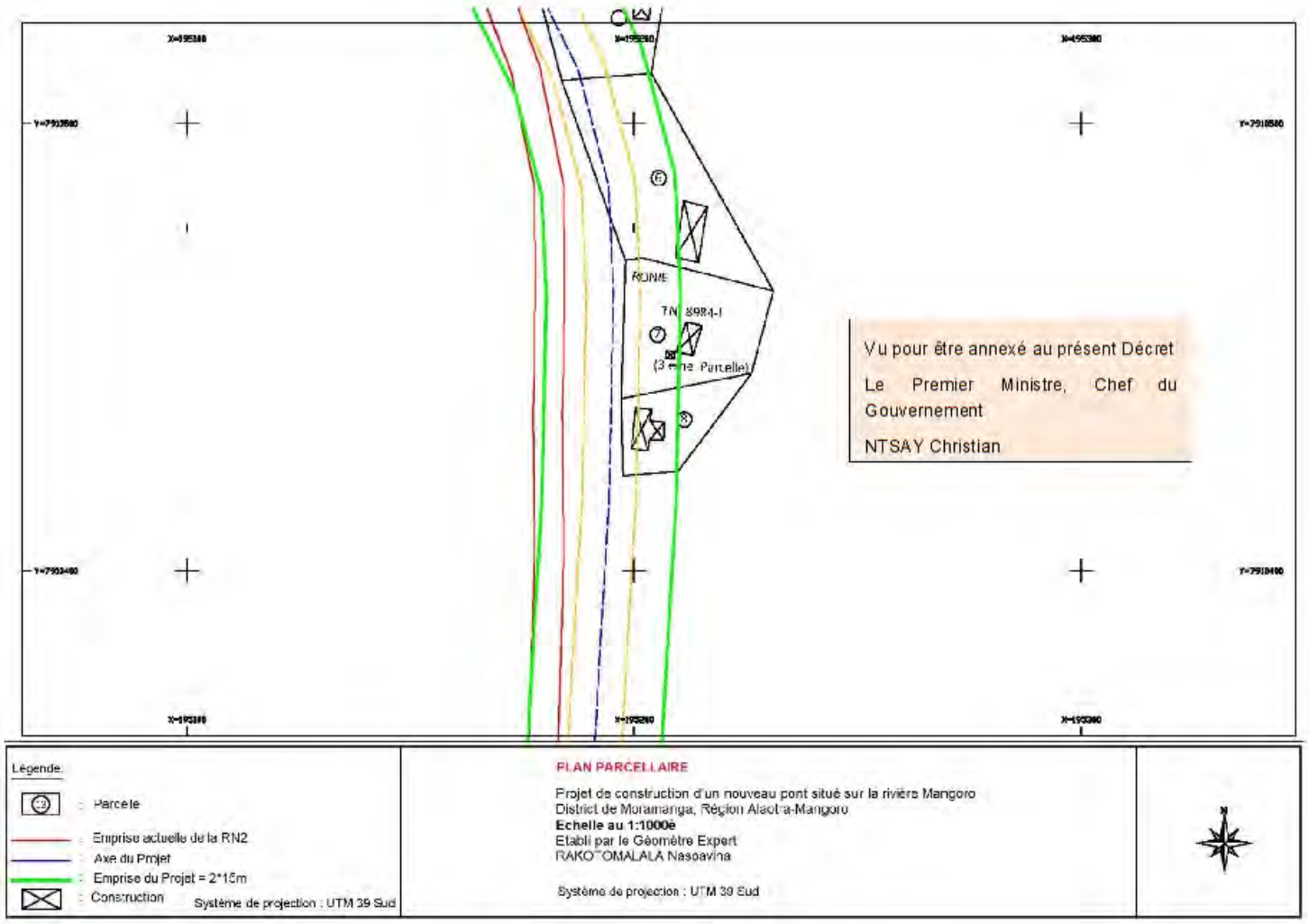
Jacques RANDRIANASOLO

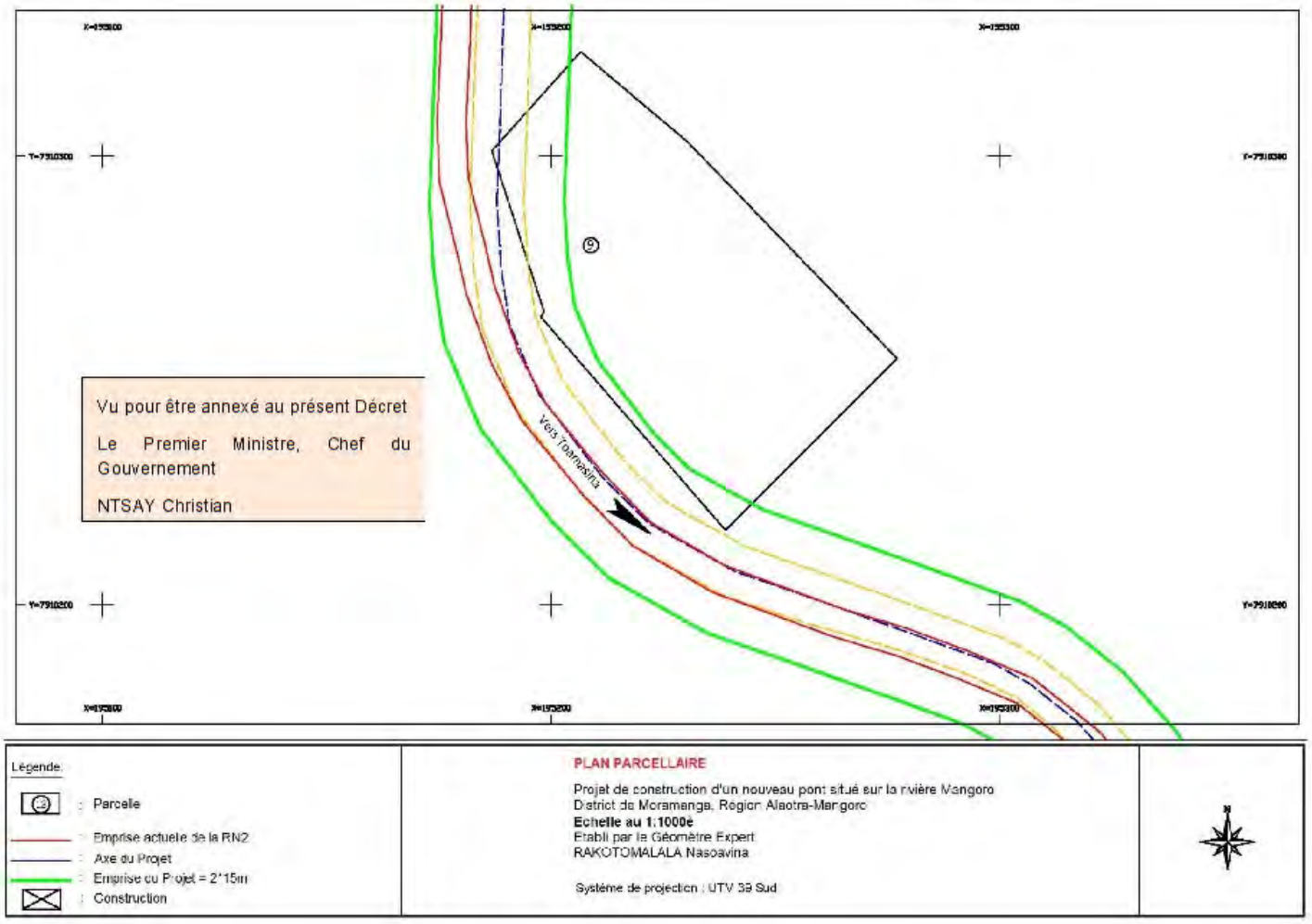
RAZAFIMAHEFA Tianarivelo
Le Ministre de l'Economie et des Finances

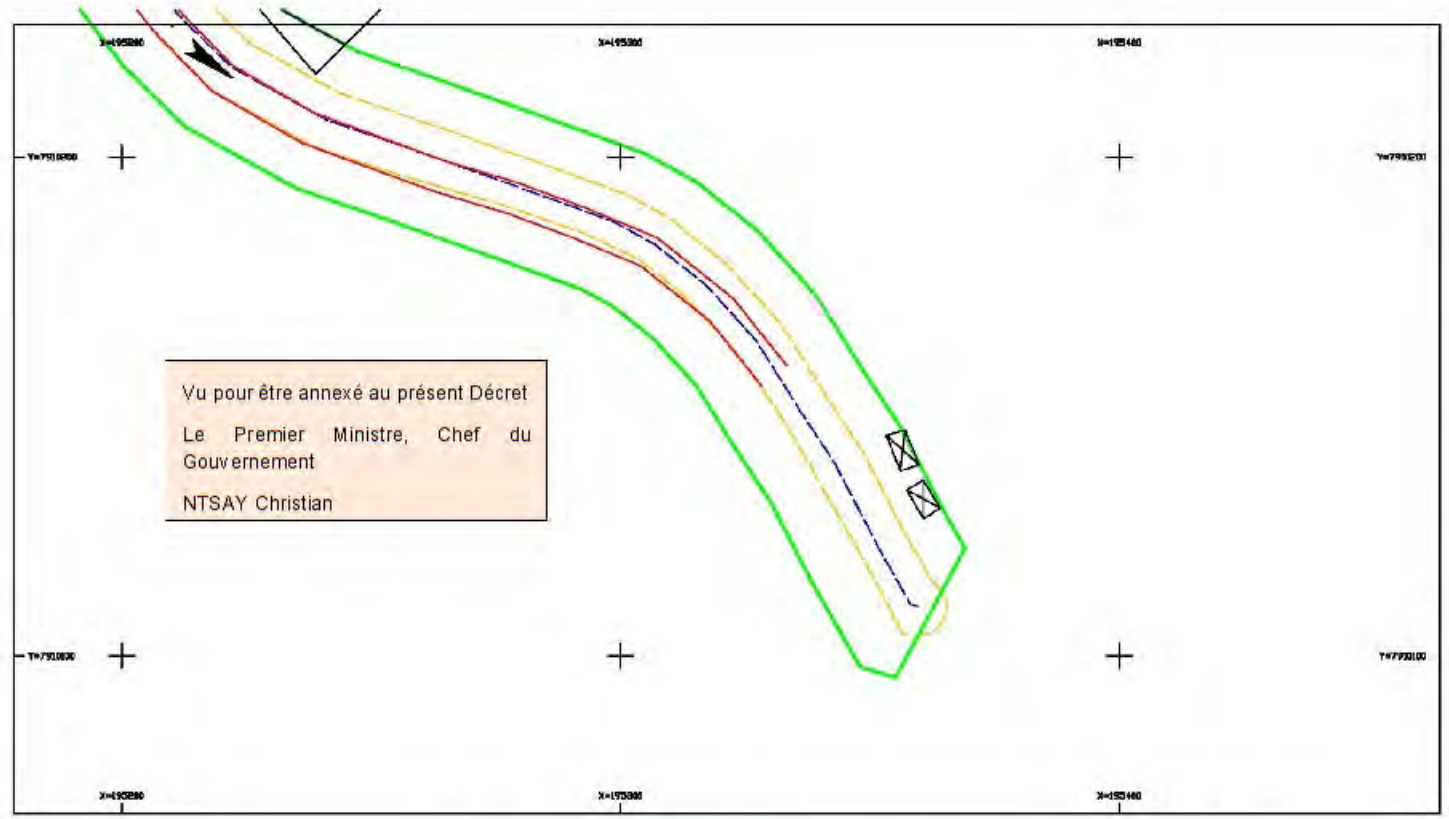
Fanomezantsoa Lucien RANARIVELO
Le Garde des Sceaux, Ministre de la Justice

ANNEXE 1: PLAN PARCELLAIRE DES TERRAINS IMPACTES POUR MANGORO




RIVIERE
TN 8984-I
(3ème Parcelle)
Vu pour être annexé au présent Décret
Le Premier Ministre, Chef du Gouvernement
NTSAY Christian
Légende:
: Parcele
: Emprise actuelle de la RN2
: Axe du Projet
: Emprise du Projet = 2*15m
: Construction
Système de projection : UTM 39 Sud
PLAN PARCELLAIRE
Projet de construction d'un nouveau pont situé sur la rivière Mangoro
District de Moramanga, Région Alaotra-Mangoro
Echelle au 1:1000e
Etabli par le Géomètre Expert
RAKOTOMALALA Nasoavina
Système de projection : UTM 39 Sud


Vu pour être annexé au présent Décret
Le Premier Ministre, Chef du Gouvernement
NTSAY Christian
Vers Toamasina
Légende
Parcelle
Emprise actuelle de la RN2
Axe du Projet
Emprise du Projet = 2*15m
Construction
PLAN PARCELLAIRE
Projet de construction d'un nouveau pont situé sur la rivière Mangoro
District de Moramanga, Region Alaotra-Mangoro
Echelle au 1:1000è
Etabli par le Géomètre Expert
RAKOTOMALALA Nasoavina
Système de projection : UTV 38 Sud



Légende:

- Parcelle
- Emprise actuelle de la RN2
- Axe du Projet
- Emprise du Projet = 2*15m
- Construction

PLAN PARCELLAIRE

Projet de construction d'un nouveau pont situé sur la rivière Mangoro
District de Moramanga, Région Alaotra-Mangoro
Echelle au 1:1000è
Etabli par le Géomètre Expert
RAKOTOMALALA Nasoavina

Système de projection : UTM 38 Sud

ANNEXE 2 : PLAN DES PARCELLES IMPACTEES POUR ANTSAPAZANA

Annexe 11

Formulaire de Surveillance Environnementale et Sociale

La partie malgache doit soumettre les résultats de la surveillance de l'environnement à la JICA en utilisant ce formulaire de surveillance tous les trimestres dans le cadre du rapport de suivi du projet.

1. Surveillance de l'environnement

1.1. Qualité de l'air

Rubriques de suivi	Situation pendant la période du rapport
Situation du niveau de poussière, de suie (évaluation visuelle)	
Diagnostic de la situation concernant la mise en œuvre de mesures	
Entretiens avec les habitants locaux	

1.2. Qualité de l'eau

Rubrique	Unité	Points de l'étude (forages)				Normes malgaches	Méthode de recensement	Remarques (Conditions générales des lieux des mesures, etc.)
		Pont de Mangoro		Pont d'Antsapatana				
		En amont	En aval	En amont	En aval			
Turbidité	NTU					<25	NF EN ISO 7027-1	
pH (température)	pH(° C)					6.0 -9.0	NF EN ISO 10523	
Chrome hexavalent	mg/l					<0.2	Spectroscopie UV-visible	
Nickel	mg/l					<2.0	Spectroscopie UV-visible	
Arsenic	mg/l					<0.5	Spectroscopie UV-visible	
Couleur	mg/l					<20	NF EN ISO 7887_D	
Température de l'eau	° C					-	-	
Conductivité électrique (25oC)	µs/cm					<200	NF EN 27888	
Dureté totale	g/l in CaCO					<180.0	NF T 90-003	
Ammonium	mg/l in NH_4					<15.0	NF T 90-015-2	
Nitrate	mg/l in NO_3					<20.0	Spectroscopie UV-visible	
Nitrite	mg/l in NO_2					<0.2	NF EN 26777	
Hydrocarbures totaux	mg/kg					-	-	
Groupes E. coli	NPP/100ml					<100	NF EN ISO 9308-3	

1.3. Déchets

Annexe 11

Rubriques de suivi	Situation pendant la période du rapport
Situation de la mise en œuvre du traitement des déchets	

1.4. Bruit & vibration (pont de Mangoro uniquement) *NOTE: Utilisez à partir de "1.9" pour enregistrer les résultats de l'enquête sur l'audience*

Rubriques (Unités)	[illegible]	[illegible]	Valeur de référence (pont de Mangoro) [illegible]				Normes malgaches	Remarques (Conditions générales des lieux des mesures, etc.)
			Valeur min.	[illegible]	Valeur min.	Valeur max.		
Niveau de bruit (dB)			43	111.8	43	106.2	—	
							—	

1.5. Pollution des sols / sédiments

Rubriques de suivi	Situation pendant la période du rapport
Entretien et inspection pour prévenir les fuites d' huile des machines de construction	

1.6. Écosystème

Rubriques de suivi	Situation pendant la période du rapport
Confirmation visuelle des organismes aquatiques, Audition aux résidents voisins	
Mouvement d'excitation avant la construction	
Restauration de la végétation riveraine	

1.7. Infrastructures sociales et services sociaux existants

Rubriques de suivi	Situation pendant la période du rapport
Confirmation de la situation de la congestion	

1.8. Les conditions de travail

Rubriques de suivi	Situation pendant la période du rapport
Confirmation de l' état de mise en œuvre des mesures de sécurité pendant le travail	
Confirmation des conditions de traitement des eaux usées et des déchets domestiques	

1.9. Accidents de la route

Date	[illegible] de l'accident	Situation de la prise en charge	Résultats de la mise en œuvre

1.10. Plaintes, etc. relatives à l' environnement du travail

Date	Contenu des plaintes	Situation de la prise en charge	Résultats de la mise en œuvre

田中

2. Surveillance sociale

2.1. Etat de mise en œuvre de la réinstallation des populaions et de l'indemnisation

Rubrique	Nombre	Etat d'avancement		Justification de l'état d'avancement		Date d'achèvement	Responsabilité Organismes
Décision finale des PAP							MAHTP
Démarches en faveur d'un consensus au égard à l'indemnisation							MAHTP
Acquisition de terrains (pont de Mangoro)							MAHTP
Acquisition de terrains (pont d'Antsapazano)							MAHTP
Réinstallation des populations (pont de Mangoro)							MAHTP
Indemnisation (pont de Mangoro)							MAHTP
Indemnisation (pont d'Antsapatono)							MAHTP

2.2. Etat de mise en œuvre de l'aide à la restauration des moyens de subsistance

Date	Critères de mise en œuvre	Situation de la prise en charge	Résultats de la mise en œuvre

2.3. Plaintes émanant des habitants

Date	Contenu des plaintes	Situation des actions engagées	Résultats de la mise en œuvre

（仮訳）

Minutes of Discussions
on the Preparatory Survey for the Project for
Rehabilitation of Bridges on the Economic Axis Antananarivo-Toamasina
（Explanation on Draft Preparatory Survey Report）

With reference to the minutes of discussions signed between Ministry of Regional Development, Building, Housing and Public Works and Japan International Cooperation Agency (hereinafter referred to as "JICA") on July 6th, 2018 and in response to the request from the Government of Republic of Madagascar (hereinafter referred to as "Madagascar") dated on 28 September 2017, JICA dispatched the Preparatory Survey Team (hereinafter referred to as “the Team”) for the explanation of Draft Preparatory Survey Report (hereinafter referred to as “the Draft Report”) for the Project for Rehabilitation of Bridges on the Economic Axis Antananarivo-Toamasina (hereinafter referred to as “the Project”).

As a result of the discussions, both sides agreed on the main items described in the attached sheets.

Antananrivo, March 15, 2019

Kenshiro TANAKA
Leader
Preparatory Survey Team

Japan International Cooperation Agency
Japan

Hajo Andrianainarivelo
Minister
Ministry of Regional Development, Building,
Housing and Public Works
Republic of Madagasca

Richard Andriamandranto
Minister
Ministry of Economy and Finance
Republic of Madagascar

ATTACHEMENT

1. Objective of the Project

The objective of the Project is to improve logistics situation on National Route No.2 by rehabilitation of bridges and access roads, thereby contributing to revitalization of logistics in Madagascar and neighborhood countries.

2. Title of the Preparatory Survey

Both sides confirmed the title of the Preparatory Survey as "the Preparatory Survey for the Project for Rehabilitation of Bridges on the Economic Axis Antananarivo-Toamasina".

3. Project site

Both sides confirmed that the sites of the Project are in Annex 1.

4. Responsible authority for the Project

Both sides confirmed the authority responsible for the Project is as follows:

4-1. Ministère de l'Aménagement du Territoire, de l'Habitat et des Travaux Publics (hereinafter referred to as "MAHTP") will be the responsible and executing authority for the Project. The executing authority shall coordinate with all the relevant authorities to ensure smooth implementation of the Project and ensure that the undertakings for the Project shall be taken care by relevant authorities properly and on time. The organization chart is shown in Annex 3.

4-2. After the completion of the Project, MAHTP will be responsible for maintenance and management of the facilities constructed by the Project.

5. Contents of the Draft Report

After the explanation of the contents of the Draft Report by the Team, the Malagasy side agreed its contents.

6. Cost estimate

Both sides confirmed that the cost estimate including the contingency shown in Annex 2 explained by the Team is provisional and will be examined further by the Government of Japan for its approval.

The contingency would cover the additional cost against natural disaster, unexpected natural conditions, etc.

7. Confidentiality of the cost estimate and technical specifications

Both sides confirmed that the cost estimate and technical specifications of the Project should never be disclosed to any third parties until all the contracts under the Project are concluded.

8. Procedures and Basic Principles of Japanese Grant

The Malagasy side agreed that the procedures and basic principles of Japanese Grant as described in Annex 4 shall be applied to the Project. In addition, the Malagasy side agreed to take necessary measures according to the procedures.

9. Timeline for the project implementation

The Team explained to the Malagasy side that the expected timeline for the project implementation is as attached in Annex 5.

10. Expected outcomes and indicators

Both sides agreed that key indicators for expected outcomes are as follows. The Malagasy side will be responsible for the achievement of agreed key indicators targeted in year 2025 and shall monitor the

progress based on those indicators.

[Quantitative indicators]

Index		Current Value (as of 2018)	Design Value (as of 2025)
Traffic Volume (vehicle/day)		2,000	3,600
Volume of Passengers (1,000 persons/year)		3,702	5,000
Volume of Cargo (1,000 tons/year)		4,509	7,500
Waiting time at approaches to a bridge (second)	Mangoro Bridge	48	0
	Antsapazana Bridge	35	0

[Qualitative indicators]

- Ensuring smooth and safe traffic flow due to improvement of road alignments
- Ensuring the safety of pedestrians due to construction of sidewallks

11. Undertakings of the Project

Both sides confirmed the undertakings of the Project as described in Annex 6. With regard to exemption of customs duties, internal taxes and other fiscal levies as stipulated in (2) 5 of Annex 6, both sides confirmed that such customs duties, internal taxes and other fiscal levies, which shall be clarified in the bid documents by MAHTP during the implementation stage of the Project.

The Malagasy side assured to take the necessary measures and coordination including allocation of the necessary budget which are preconditions of implementation of the Project. It is further agreed that the costs are indicative, i.e. at Outline Design level. More accurate costs will be calculated at the Detailed Design stage.

Both sides also confirmed that the Annex 6 will be used as an attachment of G/A.

12. Monitoring during the implementation

The Project will be monitored by the executing authority and reported to JICA by using the form of Project Monitoring Report (PMR) attached as Annex 7. The timing of submission of the PMR is described in Annex 6.

13. Project completion

Both sides confirmed that the Project completes when all the facilities constructed and equipment procured by the grant are in operation. The completion of the Project will be reported to JICA promptly, but in any event not later than six months after completion of the Project.

14. Ex-Post Evaluation

JICA will conduct ex-post evaluation after three (3) years from the project completion, in principle, with respect to five evaluation criteria (Relevance, Effectiveness, Efficiency, Impact, Sustainability). The result of the evaluation will be publicized. The Malagasy side is required to provide necessary support for the data collection.

15. Schedule of the Study

JICA will finalize the Preparatory Survey Report based on the confirmed items. The report will be sent to the Malagasy side around June 2019.

16. Environmental and Social Considerations

16-1 General Issues

16-1-1 Environmental Guidelines and Environmental Category

The Team explained that 'JICA Guidelines for Environmental and Social Considerations (April 2010)' (hereinafter referred to as "the Guidelines") is applicable for the Project. The Project is categorized as B because the Project is not considered to be a large-scale bridge project, is not located in a sensitive area, and has none of the sensitive characteristics under the "JICA guidlines for Environmental and Social Considerations (April 2010)", hence it is not likely to have a significant adverse impact on the environment.

16-1-2 Environmental Checklist

The environmental and social considerations including major impacts and mitigation measures for the Project are summarized in the Environmental Checklist attached as Annex 8. Both sides confirmed that in case of major modification of the content of the Environmental Checklist, the Malagasy side shall submit the modified version to JICA in a timely manner.

16-2 Environmental Issues

16-2-1 Environmental Impact Assessment (EIA)

Both sides confirmed the EIA report will be approved by Office National pour l'Environment in May 2019.

16-2-2 Environmental Management Plan and Environmental Monitoring Plan

Both sides confirmed Environmental Management Plan (EMP) and Environmental Monitoring Plan (EMoP) of the Project is as Annex 9, respectively. Both side agreed that environmental mitigation measures and monitoring shall be conducted based on the EMP and EMoP, which may be updated during the detailed design stage.

16-3 Social Issues

16-3-1 Land Acquisition and Resettlement

Both sides confirmed the 0.8 ha of land would be aquired and 28 people would be relocated/affected due to the implemenation of the Project.

Such land acquisition and resettlement shall be implemented based on the Abbreviated Resettlement Action Plan (ARAP) as Annex 10 which was prepared in line with the Guidelines and authorized by the Malagasy side in February 2019.

16-4 Environmental and Social Monitoring

16-4-1 Environmental Monitoring

Both sides agreed that the Malagasy side will submit results of environmental monitoring to JICA by using the monitoring form attached as Annex 11. The timing of submission of the monitoring form is described in Annex 6.

16-4-2 Social Monitoring

Both sides confirmed that the Malagasy side will implement social monitoring about land acquisition and resettlement proposed in the ARAP. The Malagasy side and the Team agreed that MAHTP will submit results of social monitoring to JICA by using the monitoring form attached as Annex 11.

16-4-3 Information Disclosure of Monitoring Results

Both sides confirmed that the Malagasy side will disclose results of environmental and social monitoring to local stakeholders through their website / in their field offices.

The Malagasy side agreed JICA will disclose results of environmental and social monitoring submitted by the Malagasy side as the monitoring forms attached as Annex 11 on its website.

17. Other Relevant Issues

17-1 Disclosure of Information

Both sides confirmed that the Preparatory Survey Report from which project cost is excluded will be

disclosed to the public after completion of the Preparatory Survey. The comprehensive report including the project cost will be disclosed to the public after all the contracts under the Project are concluded.

17-2 Safety Measures

To avoid accidents on site during the implementation of the Project, the Malagasy side agreed to cause the consultant and the contractor to enforce safety measures such as setting safety assurance to the site, providing information for security control to public, and deploying adequate security personnel.

17-3 Operation and Maintenace of the Facilities

The Team explained the importance of operation and maintenance of the facilities constructed by the Project considering that proper asset management impacts greatly on life-span of the facilities and its maintenance cost. The Malagasy side shall secure enough staff and budgets necessary for appropriate operation and maintenance of the facilities. The annual operation and maintenance costs and main maintenance items are shown below.

- Routine maintenance (every year)
  - Cleaning works (drainage pipe, expantion joints, bearings, side ditch, etc.)
  - Maintenance of road markings, sign boards, railings, etc.
  - Weeding and manding of slope surface and road shoulders
  - Preventive maintenance for bank protection area before rainy season

Sub total①: 5,170.88 (Thousand MGA/year)

- Periodic maintenance (every 5 year)
  - Remedial works of pavement (cracks, potholes, gaps, settlement, etc.)
  - Mentenance for structures (cracks, inclination, settlement, etc.)

Sub total②: 24,460.80 (Thousand MGA/year)

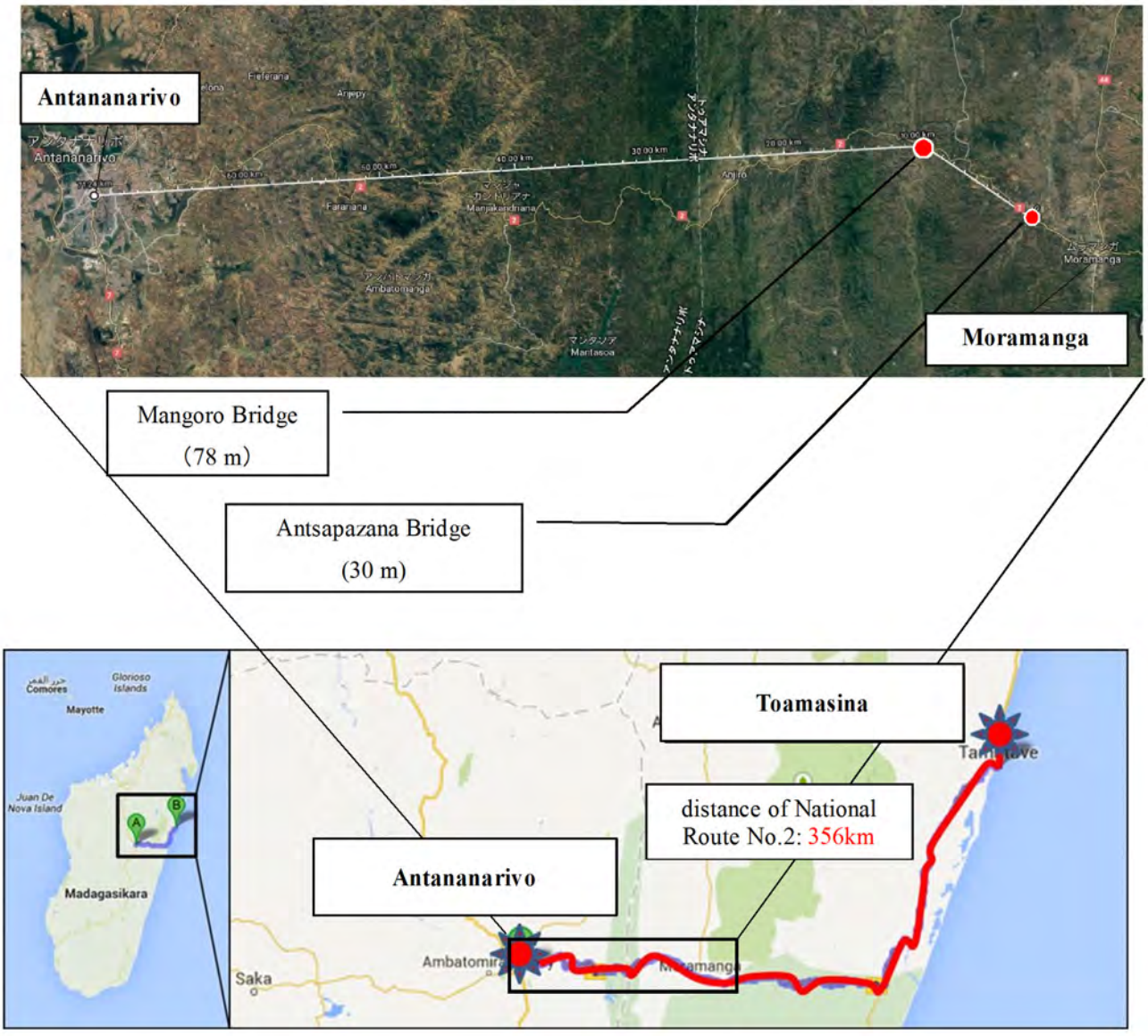
Total Cost(①+②): 29,631.68 (Thousand MGA/year)

(Conversion into USD (MGA 1=USD 0.0003) 8,889.51 USD/year)

Annex 1 Project Site
Annex 2 Project Cost Estimation
Annex 3 Organization Chart
Annex 4 Japanese Grant
Annex 5 Project Implementation Schedule
Annex 6 Major Undertakings to be taken by the Government of Madagascar
Annex 7 Project Monitoring Report (template)
Annex 8 Environmental Check List
Annex 9 Environmental Management Plan/Environmental Monitoring Plan
Annex 10 Abbreviated Resettlement Action Plan
Annex 11 Environmental and Social Monitoring Form

Annex 1

Project Site



Annex 2

Project Cost Estimation

CONFIDENTIAL

(1) Cost borne by the Government of Japan

Total :	JPY	million
• Construction :	JPY	million
• Detailed Design and Construction Supervisory Service :	JPY	million
• Contingency :	JPY	million

(2) Cost borne by the Government of Madagascar

Total :	USD	1,969,312
• Bank Charge (for the Consultant):	USD	2,700
• Obtaining approval on IEE/EIA from ONE :	USD	8,783
• Resettlement and Land Acquisition cost:	USD	54,630
• Secure and clear Lands:	USD	2,742
• Bank Charge (for the Contractor):	USD	17,957
• Budget for tax-exemption :	USD	1,864,500
• Environment Monitoring :	USD	18,000
Total annual maintenance cost :	USD	8,890

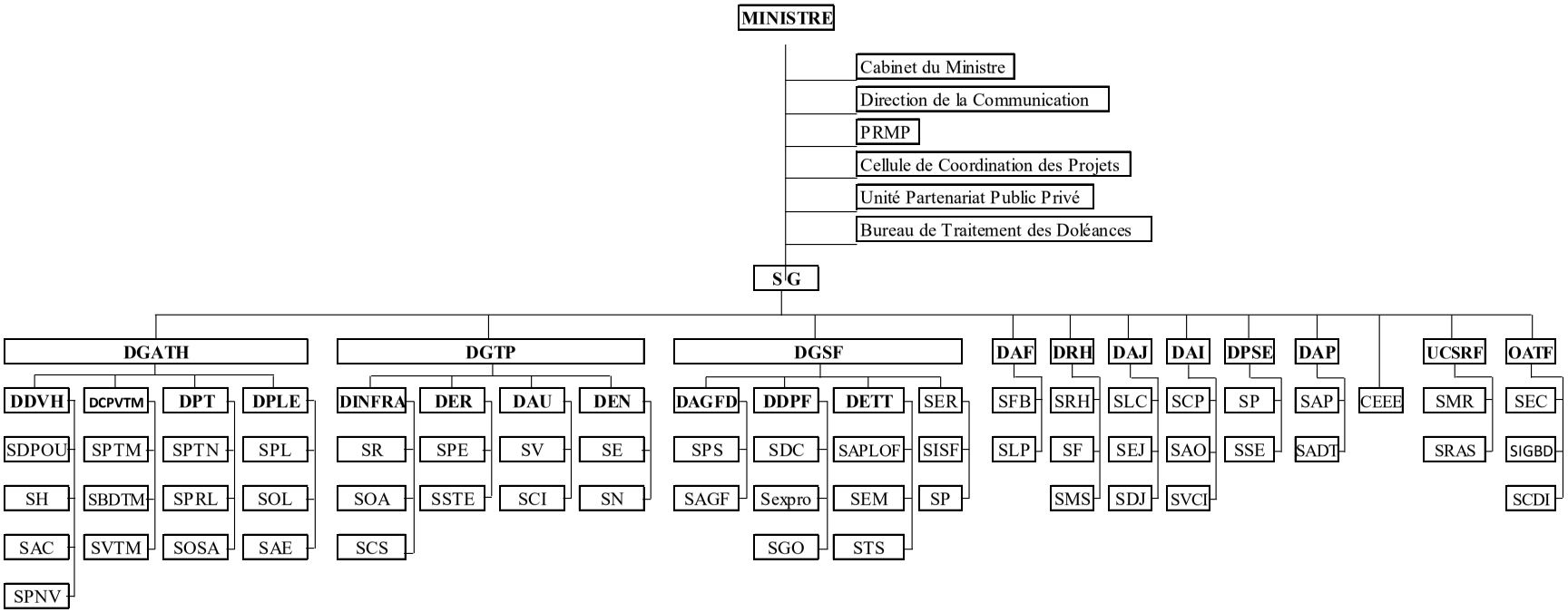
(3) Cost Estimation Condition

- Estimated timing : August 2018
- Exchange rates : USD 1.00 = JPY 111.38

(4) Others

The project is implemented in accordance with the system of Japan's Grant Aid. The above cost estimation does not assure the ceiling cost on the E/N and shall be reviewed by the Government of Japan before signing of the E/N between the two Governments. Cost borne by the Government of Madagascar is also provisional and will be assured according to progress of the Project.

MINISTRE DE L'AMENAGIMENT DU TERRITOIRE, DE L'HABITAT ET DES TRAVAUX PUBLICS
(Ministry of Territorial Development of Housing and Public Works)



DepartmentS DECONCENTRES DU MINISTERE

- Direction Régionale de l'Aménagement du Territoire, de l'Habitat et des Travaux Publics (DRATHTP)
- Department Régional de l'Aménagement du Territoire (SRAT)
- Department Régional des Travaux Publics (SRTP)
- Department Régional des Domaines (SRD)
- Department Régional Topographique (SRT)

ORGANISMES RATTACHES AU MINISTERE

1- Autorité Routière de Madagascar (ARM)
2- Fonds d'Entretien Routier (FER)
3- Institut National de l'Infrastructure (ININFRA)
4- Laboratoire National des T.P. et du Bâtiment (LNTPB)
5- Agence d'Execution des Travaux d'Intérêt Public (AGETIP)
6- Société d'Equipement Immobilier de Madagascar (SEIMAD)
7- Agence Nationale d'Appui au Logement et à l'Habitat (ANALOGH)
8- Foibe Taotsarintanin'i Madagasikara (FTM)
9- Fonds National Foncier (FNF)
10- Autorité de Protection contre les Inondations de la Plaine d'Antananarivo (APIPA)

Ministry of Territorial Development of Housing and Public Works

DGATH : Direction General of Territorial Development and Housing
DDVH : Cities and Housing Development Direction
SDPOU : Urban policy and Operations Development Department
SH : Housing Department
SAC : Architecture and Construction Department
SPNV : Department Promoting New Cities
DCPVTM : Direction of Cooperation, Planning and Valuation of the Maritime Territory
SPTM : Maritime Territory Planning Department
SBDTM : Database Department of Maritime Territory
SVTM : Valuation Department of Maritime Territory
DPT : Territorial Planning Direction
SPTN : Coordination and Planning Department of the National Territory
SPRL : Regional and Local Planning Department
SOSA : Structuring Operations Department
DPLE : Direction for the Promotion of Housing and Equipment
SPL : Housing Promotion Department
SOL : Housing Operations Department
SAE : Sanitation and Equipment Department

DGSF : General Direction of Land Departments
DAGFD : Direction of Support to Decentralized Land Management
SPS : Planning and Monitoring Department
SAGF : Land Office Support Department
DDPF : Direction of Domains and Land Property
SDC : Domains and Conservations Department
SExpro : Expropriation Department
SGO : Major Operations Department
DETT : Studies and Topographical Works Department
SAPLOF : Support Department for the Local Land Occupation Plan
SEM : Studies and Methods Department
STS : Special Works Department
SER : Studies and Complaints Department
SISF : Informatic Department of Land Departments
SP : Partnership Department

DECONCENTER DepartmentS OF THE MINISTRY at District Level
DLAT : Local Delegation of Territory Planning
CIRDOMA : Land Constituency comprising Terrier Courts
CIRTOPO : Topographic Constituency
CIRAGFD : Support Constituency to Decentralized Land Management

DGTP : General Direction of Public Works
DINFRA : Direction of Infrastructures
SR : Roads Department
SOA : Department of Works of art
SCS : Control and Monitoring Department
DER : Direction of Road Maintenance
SPE : Maintenance Programming Department
SSTE : Department of Supervision of Works Maintenance
DAU : Direction of Emergency Support
SV : Watch Department
SCI : Department of Coordination of emergency intervention
DEN : Direction of Studies and Standards
SE : Studies Department
SN : Standards Department

DAF : Financial Affairs Department
SFB : Administrative and Financial Department
SLP : Logistic and Heritage Department
DSI : Information System Department
SDMMI : Development and Maintenance of Computer Equipment Department
SARS : Network and Site Administration Department
DRH : Human Resources Department
SRH : Human Resources Department
SF : Training Department
SMS : Medico-Social Department
DAJ : Direction of Legal Affairs
SLC : Legislation and Litigation Department
SEJ : Legal Studies Department
SDJ : Legal Documentation Department
DAI : Direction of Audit and Inspection
SCP : Procedure Control Department
SAO : Organizational Audit Department
SVCI : Watch and Intervention Department
DPSE : Direction of Programming and Monitoring-Evaluation
SP : Programming Department
SSE : Monitoring-Evaluation Department
DAP : Analyzes and Prospectives Department
SAP : Prospective Analyzes Department
SADT : Territorial Development Support Department
CEEE : Studies and Environmental Assessment Unit
UCSRF : Unit for Coordination and Monitoring of Land Reform
SMR : Modernization and Restructuring Department
SRAS : Relation with other Sectors Department
OATF : Observatory of Territorial and Land Management
SEC : Studies and Capitalization Department
SIGBD : Information System and Database Management Department
SCDI : Communication and Information Dissemination Department

JAPANESE GRANT

The Japanese Grant is non-reimbursable fund provided to a recipient country (hereinafter referred to as “the Recipient”) to purchase the products and/or 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. Followings are the basic features of the project grants operated by JICA (hereinafter referred to as “Project Grants”).

1. Procedures of Project Grants

Project Grants are conducted through following procedures (See “PROCEDURES OF JAPANESE GRANT” for details):

(1) Preparation

- The Preparatory Survey (hereinafter referred to as “the Survey”) conducted by JICA

(2) Appraisal

-Appraisal by the government of Japan (hereinafter referred to as “GOJ”) and JICA, and Approval by the Japanese Cabinet

(3) Implementation

Exchange of Notes

-The Notes exchanged between the GOJ and the government of the Recipient

Grant Agreement (hereinafter referred to as “the G/A”)

-Agreement concluded between JICA and the Recipient

Banking Arrangement (hereinafter referred to as “the B/A”)

-Opening of bank account by the Recipient in a bank in Japan (hereinafter referred to as "the Bank") to receive the grant

Construction works/procurement

-Implementation of the project (hereinafter referred to as “the Project”) on the basis of the G/A

(4) Ex-post Monitoring and Evaluation

-Monitoring and evaluation at post-implementation stage

2. Preparatory Survey

(1) Contents of the Survey

The aim of the Survey is to provide basic documents necessary for the appraisal of the 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 necessary for the implementation of the Project.
- Evaluation of the feasibility of the Project to be implemented under the Japanese Grant 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 an outline design of the Project.

- Estimation of costs of the Project.
- Confirmation of Environmental and Social Considerations

The contents of the original request by the Recipient are not necessarily approved in their initial form. The Outline Design of the Project is confirmed based on the guidelines of the Japanese Grant.

JICA requests the Recipient to take 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 executing agency of the Project. Therefore, the contents of the Project are confirmed by all relevant organizations of the Recipient based on the Minutes of Discussions.

(2) Selection of Consultants

For smooth implementation of the Survey, JICA contracts with (a) 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 feasibility of the Project.

3. Basic Principles of Project Grants

(1) Implementation Stage

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 singed between the GOJ and the Government of the Recipient to make a pledge for assistance, which is followed by the conclusion of the G/A between JICA and the Recipient to define the necessary articles, in accordance with the E/N, to implement the Project, such as conditions of disbursement, responsibilities of the Recipient, and procurement conditions. The terms and conditions generally applicable to the Japanese Grant are stipulated in the "General Terms and Conditions for Japanese Grant (January 2016)."

2) Banking Arrangements (B/A) (See "Financial Flow of Japanese Grant (A/P Type)" for details)

a) The Recipient shall open an account or shall cause its designated authority to open an account under the name of the Recipient in the Bank, in principle. JICA will disburse the Japanese Grant in Japanese yen for the Recipient to cover the obligations incurred by the Recipient under the verified contracts.

b) The Japanese Grant will be disbursed when payment requests are submitted by the Bank to JICA under an Authorization to Pay (A/P) issued by the Recipient.

3) Procurement Procedure

The products and/or services necessary for the implementation of the Project shall be procured in accordance with JICA's procurement guidelines as stipulated in the G/A.

4) 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 to continue to work on the Project's implementation after the E/N and G/A.

5) Eligible source country

In using the Japanese Grant disbursed by JICA for the purchase of products and/or services, the eligible source countries of such products and/or services shall be Japan and/or the Recipient. The Japanese Grant may be used for the purchase of the products and/or services of a third country as eligible, if necessary, taking into account the quality, competitiveness and economic rationality of products and/or services necessary for achieving the objective of the Project. However, the prime contractors, namely, constructing and procurement firms, and the prime consulting firm, which enter into contracts with the Recipient, are limited to "Japanese nationals", in principle.

6) Contracts and Concurrence by JICA

The Recipient will conclude contracts denominated in Japanese yen with Japanese nationals. Those contracts shall be concurred by JICA in order to be verified as eligible for using the Japanese Grant.

7) Monitoring

The Recipient is required to take their initiative to carefully monitor the progress of the Project in order to ensure its smooth implementation as part of their responsibility in the G/A, and to regularly report to JICA about its status by using the Project Monitoring Report (PMR).

8) Safety Measures

The Recipient must ensure that the safety is highly observed during the implementation of the Project.

9) Construction Quality Control Meeting

Construction Quality Control Meeting (hereinafter referred to as the “Meeting”) will be held for quality assurance and smooth implementation of the Works at each stage of the Works. The member of the Meeting will be composed by the Recipient (or executing agency), the Consultant, the Contractor and JICA. The functions of the Meeting are as followings:

a) Sharing information on the objective, concept and conditions of design from the Contractor, before start of construction.
b) Discussing the issues affecting the Works such as modification of the design, test, inspection, safety control and the Client’s obligation, during of construction.

(2) Ex-post Monitoring and Evaluation Stage

1) After the project completion, JICA will continue to keep in close contact with the Recipient in order to monitor that the outputs of the Project is used and maintained properly to attain its expected outcomes.

2) In principle, JICA will conduct ex-post evaluation of the Project after three years from the completion. It is required for the Recipient to furnish any necessary information as JICA may reasonably request.

(3) Others

1) Environmental and Social Considerations

The Recipient shall carefully consider environmental and social impacts by the Project and must comply with the environmental regulations of the Recipient and JICA Guidelines for Environmental and Social Considerations (April, 2010).

2) Major undertakings to be taken by the Government of the Recipient

For the smooth and proper implementation of the Project, the Recipient is required to undertake necessary

measures including land acquisition, and bear an advising commission of the A/P and payment commissions paid to the Bank as agreed with the GOJ and/or JICA. The Government of the Recipient shall ensure that customs duties, internal taxes and other fiscal levies which may be imposed in the Recipient with respect to the purchase of the Products and/or the Services be exempted or be borne by its designated authority without using the Grant and its accrued interest, since the grant fund comes from the Japanese taxpayers.

3) Proper Use

The Recipient is required to maintain and use properly and effectively the products and/or services under the Project (including the facilities constructed and the equipment purchased), to assign staff necessary for this operation and maintenance and to bear all the expenses other than those covered by the Japanese Grant.

4) Export and Re-export

The products purchased under the Japanese Grant should not be exported or re-exported from the Recipient.

PROCEDURES OF JAPANESE GRANT

Stage	Procedures	Remarks	Recipient Government	Japanese Government	JICA	Consultants	Contractors	Agent Bank
Official Request	Request for grants through diplomatic channel	Request shall be submitted before appraisal stage.	x	x				
1. Preparation	(1) Preparatory Survey Preparation of outline design and cost estimate		x		x	x		
2. Appraisal	(2)Preparatory Survey Explanation of draft outline design, including cost estimate, undertakings, etc.		x		x	x		
	(3)Agreement on conditions for implementation	Conditions will be explained with the draft notes (E/N) and Grant Agreement (G/A) which will be signed before approval by Japanese government.	x	x (E/N)	x (G/A)			
	(4) Approval by the Japanese cabinet			x				
3. Implementation	(5) Exchange of Notes (E/N)		x	x				
	(6) Signing of Grant Agreement (G/A)		x		x			
	(7) Banking Arrangement (B/A)	Need to be informed to JICA	x					x
	(8) Contracting with consultant and issuance of Authorization to Pay (A/P)	Concurrence by JICA is required	x			x		x
	(9) Detail design (D/D)		x			x		
	(10) Preparation of bidding documents	Concurrence by JICA is required	x			x		
	(11) Bidding	Concurrence by JICA is required	x			x	x	
	(12) Contracting with contractor/supplier and issuance of A/P	Concurrence by JICA is required	x				x	x
	(13) Construction works/procurement	Concurrence by JICA is required for major modification of design and amendment of contracts.	x			x	x	
	(14) Completion certificate		x			x	x	
4. Ex-post monitoring & evaluation	(15) Ex-post monitoring	To be implemented generally after 1, 3, 10 years of completion, subject to change	x		x			
	(16) Ex-post evaluation	To be implemented basically after 3 years of completion	x		x			

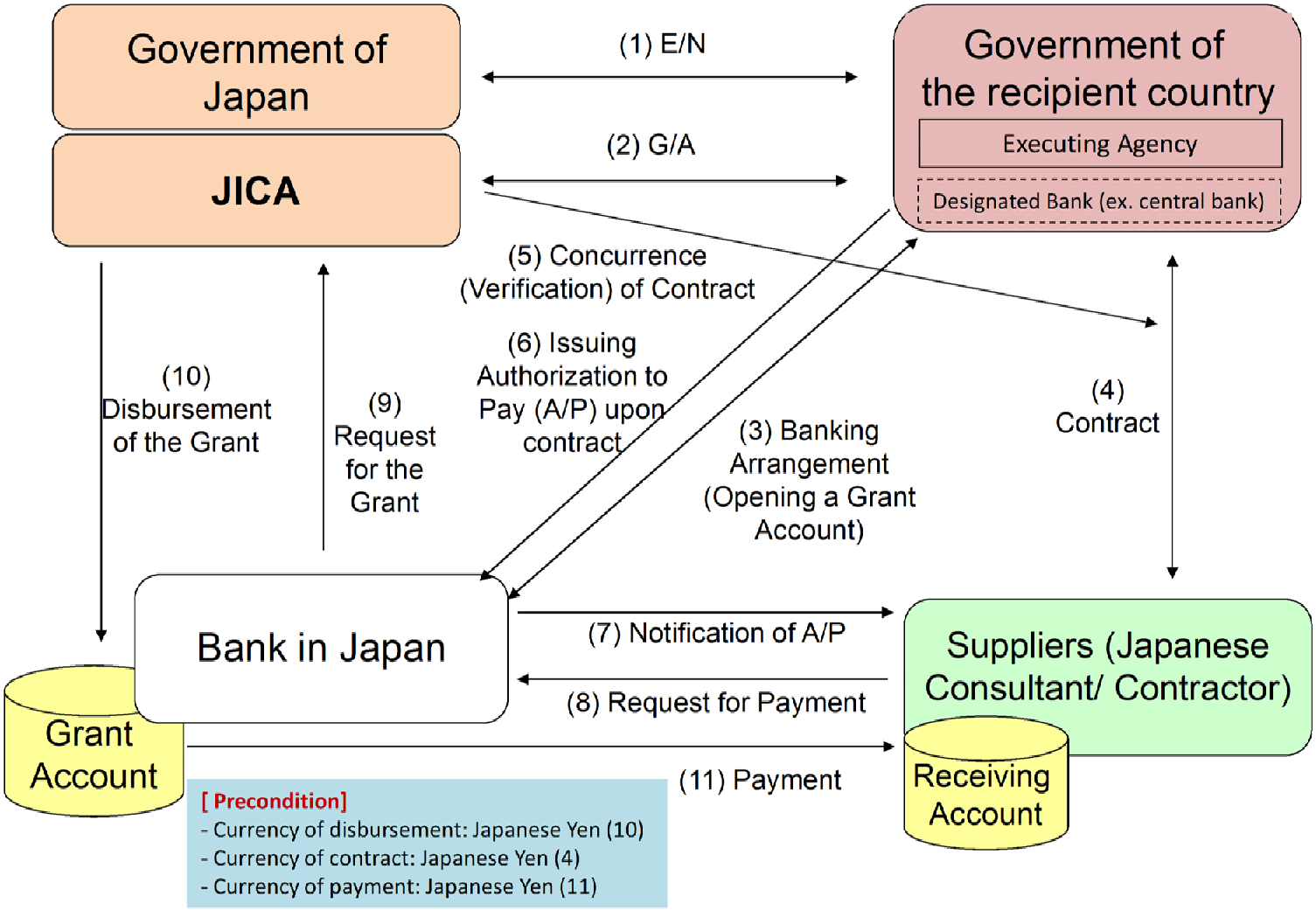
notes:

1. Project Monitoring Report and Report for Project Completion shall be submitted to JICA as agreed in the G/A.

2. Concurrence by JICA is required for allocation of grant for remaining amount and/or contingencies as agreed in the G/A.

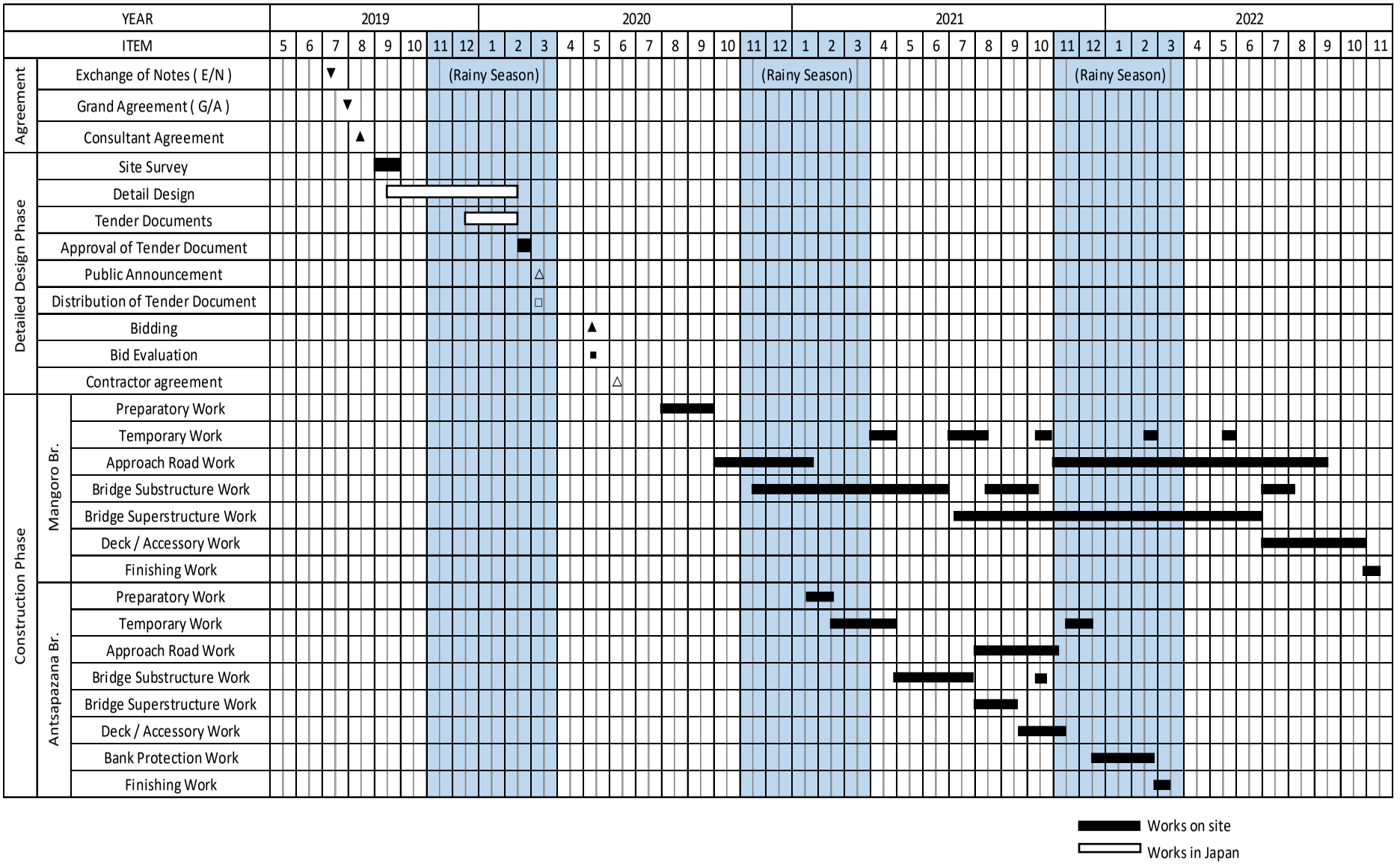
Attachment 2

Financial Flow of Japanese Grant (A/P Type)



Annex 5

Project Implementation Schedule



Annex 6

Major Undertakings to be taken by the Government of Madagascar

1. Specific obligations of the Government of Madagascar which will not be funded with the Grant

(1) Before the Bidding

NO	Items	Deadline	In charge	Estimated Cost (USD) *(MGA)*	Ref.
1	To open bank account (B/A)	within 1 month after signing of G/A	MAHTP	-	
2	To issue Authorization to Pay (A/P) to a bank in Japan (the Agent Bank) for the payment to the consultant	within 1 month after the signing of the contract	MAHTP/ MEF	2,700.00 *(9,000,000)*	
3	To approve IEE/EIA (Conditions of approval should be fulfilled, if any) and secure necessary budget for implementation	by May 2019	MAHTP/ ONE	8,783.00 *(29,278,000)*	
4	To secure necessary budget, implement land acquisition and resettlement (including preparation of resettlement sites) and compensation Project Affected Persons (PAPs) with full replacement cost in accordance with ARAP	before notice of the bidding document	MAHTP/ MEF	54,630.00 *(182,099,000)*	
5	To implement social monitoring, and to submit the monitoring results to JICA, by using the monitoring form, on a quarterly basis as a part of Project Monitoring Report	till land acquisition and resettlement complete	MAHTP	-	
6	To secure and clear the following land 1) the Project sites 2) temporary constructions yard and stock yards near the Project sites 3) borrow pits and disposal sites near the Project sites	before notice of the bidding document	MAHTP	2,742.00 *(9,140,000)*	
7	To clear, level and reclaim the sites, which will be confirmed in the draft final report.	before notice of the bidding document	MAHTP	-	
8	To obtain the planning, zoning, building permit	before notice of the bidding document	MAHTP	-	
9	To submit Project Monitoring Report (with the result of Detailed Design)	before preparation of the bidding document	MAHTP	-	

(2) During the Project Implementation

NO	Items	Deadline	In charge	Estimated Cost (USD) *(MGA)*	Ref.
1	To issue A/P to a bank in Japan (the Agent Bank) for the payment to the Supplier(s)	within 1 month after signing of the contract	MAHTP/ MEF	-	
2	To bear the following commissions to a bank in Japan for the banking services based upon the B/A		-	-	
	1) Advising commission of A/P	within 1 month after the signing of the contract	MAHTP/ MEF	17,957.00 *(59,855,000)*	

	2) Payment commission of A/P	every payment	MAHTP/ MEF	*(59,855,000)*	
3	To ensure prompt unloading and customs clearance at the port of disembarkation in recipient country and to assist the Supplier with internal transportation therein.		MAHTP	-	
4	To accord Japanese physical persons and/or physical persons of third countries 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 country of the Recipient and stay therein for the performance of their work.	during the Project	MAHTP	-	
5	To ensure that customs duties, internal taxes and other fiscal levies which may be imposed in the country of the Recipient with respect to the purchase of the products and/or the Services be exempted;	during the Project	MAHTP/ MEF	1,864,500 *(6,215,000,000)*	
6	To bear all the expenses, other than those covered by the Grant, necessary for the implementation of the Project.	during the Project	MAHTP/ MEF	-	
7	1) To submit Project Monitoring Report	every month	MAHTP	-	
	2) To submit Project Monitoring Report (final)	within 1 month after signing of Certificate of Completion for the works under the contract	MAHTP	-	
8	To submit a report concerning completion of the Project	within 6 months after completion of the Project	MAHTP	-	
9	To implement ARAP (livelihood restoration program, if needed)	for a period based on livelihood restoration program	MAHTP	-	
10	To implement EMP and EMoP	during the construction	MAHTP	18,000.00 *(60,000,000)*	
11	To submit results of environmental monitoring to JICA, by using the monitoring form, on a quarterly basis as a part of Project Monitoring Report	during the construction	MAHTP	-	
12	To implement social monitoring, and to submit the monitoring results to JICA, by using the monitoring form, on a quarterly basis as a part of Project Monitoring Report -Period of the monitoring may be extended if affected persons' livelihoods are not sufficiently restored. Extension of the monitoring will be decided based on agreement between MAHTP and JICA.	- until the end of livelihood restoration program (In case that livelihood restoration program is provided) - for two years after land acquisition and resettlement complete (In case that livelihood restoration program is not provided)	MAHTP	-	

(3) After the Project

NO	Items	Deadline	In charge	Estimated Cost (USD) *(MGA)*	Ref.
1	To implement EMP and EMoP	for a period based on EMP and EMoP	MAHTP	-	
2	To submit results of environmental monitoring to JICA, by using the monitoring form, semiannually - The period of environmental monitoring may be extended if any significant negative impacts on the environment are found. The extension of environmental monitoring will be decided based on the agreement between MAHTP and JICA.	for 3 years after the Project	MAHTP	-	
3	To maintain and use properly and effectively the facilities constructed and equipment provided under the Grant Aid 1) Allocation of maintenance cost 2) Operation and maintenance structure 3) Routine check/Periodic inspection	After completion of the construction	MAHTP	8,890.00 *(29,632,000)*	

2. Major Undertakings to be covered by the Grant Aid

施工・調達業者契約認証まで非公表

NO	Items	Deadline	Amount (Million Japanese Yen)
1	Rehabilitation of the bridges and approach roads		
2	To implement detailed design, bidding support and construction supervision (Consulting Service)		
3	Contingencies		

Project Monitoring Report
on
Rehabilitation of Bridges on the Economic Axis Antananarivo-Toamasina
Grant Agreement No. XXXXXXX

20XX, Month

Organizational Information

Signer of the G/A (Recipient)	Person in Charge (Designation) Contacts Address: Phone/FAX: Email:
Executing Agency	Person in Charge (Designation) Contacts Address: Phone/FAX: Email:
Line Ministry	Person in Charge (Designation) Contacts Address: Phone/FAX: Email:

General Information:

Project Title	
E/N	Signed date: Duration:
G/A	Signed date: Duration:
Source of Finance	Government of Japan: Not exceeding JPY ____mil. Government of (_____):

1: Project Description

1-1 Project Objective

1-2 Project Rationale

- Higher-level objectives to which the project contributes (national/regional/sectoral policies and strategies)
- Situation of the target groups to which the project addresses

1-3 Indicators for measurement of "Effectiveness"

Quantitative indicators to measure the attainment of project objectives		
Indicators	Original (Yr)	Target (Yr)
Qualitative indicators to measure the attainment of project objectives		

2: Details of the Project

2-1 Location

Components	**Original** *(proposed in the outline design)*	**Actual**
1.		

2-2 Scope of the work

Components	**Original*** *(proposed in the outline design)*	**Actual***
1.		

Reasons for modification of scope (if any).

(PMR)

2-3 Implementation Schedule

Items	Original		Actual
	(proposed in the outline design)	*(at the time of signing the Grant Agreement)*	

Reasons for any changes of the schedule, and their effects on the project (if any)

2-4 Obligations by the Recipient

2-4-1 Progress of Specific Obligations

See Attachment 2.

2-4-2 Activities

See Attachment 3.

2-4-3 Report on RD

See Attachment 11.

2-5 Project Cost

2-5-1 Cost borne by the Grant(<u>Confidential until the Bidding</u>)

Components			Cost (Million Yen)	
	Original *(proposed in the outline design)*	Actual *(in case of any modification)*	Original[1),2)] *(proposed in the outline design)*	Actual
	1.			
Total				

Note: 1) Date of estimation:
2) Exchange rate: 1 US Dollar = Yen

2-5-2 Cost borne by the Recipient

Components			Cost (1,000 Taka)	
	Original *(proposed in the outline design)*	Actual *(in case of any modification)*	Original[1),2)] *(proposed in the outline design)*	Actual
	1.			

Note: 1) Date of estimation:
2) Exchange rate: 1 US Dollar =

Reasons for the remarkable gaps between the original and actual cost, and the countermeasures (if any)

(PMR)

2-6 Executing Agency

- Organization's role, financial position, capacity, cost recovery etc,
- Organization Chart including the unit in charge of the implementation and number of employees.

Original *(at the time of outline design)* name: role: financial situation: institutional and organizational arrangement (organogram): human resources (number and ability of staff):
Actual *(PMR)*

2-7 Environmental and Social Impacts

- The results of environmental monitoring based on Attachment 5 (in accordance with Schedule 4 of the Grant Agreement).
- The results of social monitoring based on in Attachment 5 (in accordance with Schedule 4 of the Grant Agreement).
- Disclosed information related to results of environmental and social monitoring to local stakeholders (whenever applicable).

3: Operation and Maintenance (O&M)

3-1 Physical Arrangement

- Plan for O&M (number and skills of the staff in the responsible division or section, availability of manuals and guidelines, availability of spareparts, etc.)

Original *(at the time of outline design)*
Actual *(PMR)*

3-2 Budgetary Arrangement

- Required O&M cost and actual budget allocation for O&M

Original *(at the time of outline design)*
Actual *(PMR)*

4: Potential Risks and Mitigation Measures

- Potential risks which may affect the project implementation, attainment of objectives, sustainability
- Mitigation measures corresponding to the potential risks

Assessment of Potential Risks (*at the time of outline design)*

Potential Risks	Assessment
1. (Description of Risk)	Probability: High/Moderate/Low
	Impact: High/Moderate/Low
	Analysis of Probability and Impact:
	Mitigation Measures:
	Action required during the implementation stage:
	Contingency Plan (if applicable):
2. (Description of Risk)	Probability: High/Moderate/Low
	Impact: High/Moderate/Low
	Analysis of Probability and Impact:
	Mitigation Measures:
	Action required during the implementation stage:
	Contingency Plan (if applicable):
3. (Description of Risk)	Probability: High/Moderate/Low
	Impact: High/Moderate/Low
	Analysis of Probability and Impact:
	Mitigation Measures:

	Action required during the implementation stage:
	Contingency Plan (if applicable):
Actual Situation and Countermeasures	
(PMR)	

5: Evaluation and Monitoring Plan (after the work completion)

5-1 Overall evaluation

Please describe your overall evaluation on the project.

5-2 Lessons Learnt and Recommendations

Please raise any lessons learned from the project experience, which might be valuable for the future assistance or similar type of projects, as well as any recommendations, which might be beneficial for better realization of the project effect, impact and assurance of sustainability.

5-3 Monitoring Plan of the Indicators for Post-Evaluation

Please describe monitoring methods, section(s)/department(s) in charge of monitoring, frequency, the term to monitor the indicators stipulated in 1-3.

Attachment

1. Project Location Map
2. Specific obligations of the Recipient which will not be funded with the Grant
3. Monthly Report submitted by the Consultant

Appendix - Photocopy of Contractor's Progress Report (if any)
- Consultant Member List
- Contractor's Main Staff List

4. Check list for the Contract (including Record of Amendment of the Contract/Agreement and Schedule of Payment)
5. Environmental Monitoring Form / Social Monitoring Form
6. Monitoring sheet on price of specified materials (Quarterly)
7. Report on Proportion of Procurement (Recipient Country, Japan and Third Countries) (PMR (final)only)
8. Pictures (by JPEG style by CD-R) (PMR (final)only)
9. Equipment List (PMR (final)only)
10. Drawing (PMR (final)only)
11. Report on RD (After project)

Monitoring sheet on price of specified materials

1. Initial Conditions (Confirmed)

	Items of Specified Materials	Initial Volume A	Initial Unit Price (\) B	Initial total Price C=A×B	1% of Contract Price D	Condition of payment	
						Price (Decreased) E=C−D	Price (Increased) F=C+D
1	Item 1	●●t	●	●	●	●	●
2	Item 2	●●t	●	●	●		
3	Item 3						
4	Item 4						
5	Item 5						

2. Monitoring of the Unit Price of Specified Materials

(1) Method of Monitoring : ●●

(2) Result of the Monitoring Survey on Unit Price for each specified materials

	Items of Specified Materials	1st ●month, 2015	2nd ●month, 2015	3rd ●month, 2015	4th	5th	
1	Item 1						
2	Item 2						
3	Item 3						
4	Item 4						
5	Item 5						

(3) Summary of Discussion with Contractor (if necessary)

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Report on Proportion of Procurement (Recipient Country, Japan and Third Countries)

（Actual Expenditure by Construction and Equipment each）

	Domestic Procurement （Recipient Country） A	Foreign Procurement （Japan） B	Foreign Procurement （Third Countries） C	Total D
Construction Cost	（A/D%）	（B/D%）	（C/D%）	
Direct Construction Cost	（A/D%）	（B/D%）	（C/D%）	
others	（A/D%）	（B/D%）	（C/D%）	
Equipment Cost	（A/D%）	（B/D%）	（C/D%）	
Design and Supervision Cost	（A/D%）	（B/D%）	（C/D%）	
Total	（A/D%）	（B/D%）	（C/D%）	

Annex 8

Environmental Check List

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)(b)(c)(d) For this project, environmental impact assessment procedures have not been implemented so far and no EIA report has been prepared. In this survey, MAHTP, the project implementing entity, submitted an application for screening to ONE to judge necessary environmental impact assessment procedures, and as a result of the screening, it was judged that EIA was necessary . We create an EIA report using the survey results in this survey and conduct approval procedures.
	(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) Stakeholder meetings including affected residents are conducted twice in total, and contents of the project and the potential impacts, compensation policy, etc. are explained. (b) Comments from residents are reflected in the items of the environmental management plan. And monitoring is planned to be implemented in accordance with the management plan.
	(3) Examination of Alternatives	(a) Have alternative plans of the project been examined with social and environmental considerations?	(a) Y	(a) Comparative studies are made on four plans including a plan not to implement a project from the viewpoint of social and environmental considerations including aspects of safety, cost, and the like.
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) If air quality already exceed country's standards near the route, is there a possibility that the project will make air pollution worse?	(a) N (b) Y	(a) There are no standard relating with ambient air quality in Madagascar. (b) It is assumed that there will not be a large influence on air quality based on an assumption of the expected number of construction machines to be used. Although traffic volume increases at the time of service, it is conceivable that a congestion is eliminated and a speed of travel becomes faster thanks to the construction of an additional traffic lane (a two-way-traffic), thus deterioration of air quality does not occur. As there is no national standard value for ambient air quality, monitoring is carried out by hearing from neighboring residents.
	(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 the project will contaminate water sources, such as well water? (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) Y (b) N (c) N	(a) The turbid water generated by the construction work may affect the surface water. If a large amount of fuel or oil leaks due to an accident during construction, there is a possibility of contaminating the water area. Also, at the Antsapazana bridge, soil runoff occurs due to heavy rainfall and flood in the embankment part of the detour route, and the river may be polluted. On the other hand, at the time of service, no water pollution occurs. Countermeasures for foregoing events are a construction of depositting reservoirs within the construction site for maintnance of surface water quality, a daily check of construction equipments for prevention of oil leaking, and use of tarpaulin for prevention of spill of embankment (detour) respectivelly. (b) No particular assumption is made. (c) No parking or service areas are planned.
	(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) No parking or service areas are planned.
	(4) Noise and Vibration	(a) Do noise and vibrations from the vehicle and train traffic comply with the country's standards? (b) Do low frequency sound from the vehicle and train traffic comply with the country's standards?	(a) N (b) N	(a) Environmental standards for noise and vibration are not specified in the country concerned. (b) Environmental standards for low frequency sound are not specified in the country concerned. Since there are no no standards for noise and vibration, the contractor is requested to carry out construction works carefully in order to mitigate generation of noise and vibration. Additionally, daytime works is recommended in stead of nighttime works
3 Natural Environment	(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 around the project 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 bridges and access 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	(a) N (b) N (c) N (d) N (e) N (f) N	(a) (b) (c) (d) There are no important natural environments, valuable species habitats around the project site, and no serious impact on ecosystem is feared. (e) (f) Since it is replacement of existing bridges, great impact is not assumed.

	(3) Hydrology	(a) Is there a possibility that hydrologic changes due to the installation of structures will adversely affect surface water and groundwater flows?	(a) N	(a) Because there is no obstacle to the flow of water by newly establishing / replacing the bridge, there is no particular hydrologic changes.
	(4) Topography and Geology	(a) 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? (b) 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? (c) 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) Y	(a) (b) Events affecting the terrain are not assumed. (c) On the Antsapazana Bridge, the possibility that the embankment of the detour spill by heavy rain and flooding. However, spill prevention measures are taken such as covering the embankment slope with a tarpaulin, etc.
4 Social Environment	(1) Resettlement	(a) Is involuntary resettlement caused by project implementation? If involuntary resettlement is caused, are efforts made to minimize the impacts caused by the resettlement? (b) Is adequate explanation on compensation and resettlement assistance given to affected people prior to resettlement? (c) Is the resettlement plan, including compensation with full replacement costs, restoration of livelihoods and living standards developed based on socioeconomic studies on resettlement? (d) Are the compensations going to be paid prior to the resettlement? (e) Are the compensation policies prepared in document? (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? (g) Are agreements with the affected people obtained prior to resettlement? (h) Is the organizational framework established to properly implement resettlement? Are the capacity and budget secured to implement the plan? (i) Are any plans developed to monitor the impacts of resettlement? (j) Is the grievance redress mechanism established?	(a) Y (b) Y (c) Y (d) Y (e) Y (f) Y (g) Y (h) Y (i) Y (j) Y	(a) At the Mangoro bridge site, although the least influential plan is adopted among alternative proposals, it is assumed that resettlement for 5 houses are demanded. There are no resettlement at Antsapazana Bridge site. For construction of Antsapazana bridge, temporarily leasing of lands for construction of a detour. (b) At the 2nd Stakeholder Meeting, explanation is made on compensation policy etc. In the EIA approval process, a committee will be set up, details f compensation to affected people will be confirmed and publicized. (c) In the process of EIA application, compensation contents are confirmed and a relocation plan is formulated. (d) It is planned to be done before construction starts.(Prior to the resettlement) (e) described in the report at the time of the EIA application process. (f) If there is concern about the impact on socially vulnerable people, a life reconstruction support plan will be formulated. (g) Notified to the affected people during the EIA application procedure, and agreed in writing before the resettlement and compensation start. (h) Based on the legal system of the country concerned and the JICA guidelines, appropriate measures are taken. (i) Described in the report at the time of the EIA application process. (j) Examined and described in ARAP, then established by MAHTP.
	(2) Living and Livelihood	(a) Where bridges and access 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? (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? (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? (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)? (e) Is there any possibility that project will impede the movement of inhabitants? (f) Is there any possibility that bridges will cause a sun shading and radio interference?	(a) N (b) N (c) Y (d) N (e) N (f) N	(a) (b) There will be no major change to residents' living, land use, lifestyle measures, etc. at Mangoro bridge site because it is planed to construct new bridge in parallel with existing Mangoro bridge. There will be no major change to residents' living, land use, lifestyle measures, etc. at Antsapazana bridge site, because the bridge is replaced at the same location. (c) Since inflow of construction workers to the villages near the project sites might increase opportunities for HIV/AIDS, education for personnel involved in project should be thoroughly conducted. (d) (e) (f) The Mangoro bridge is new and the existing bridge will be replaced at the Antsapazana Bridge, but due to the provision of a detour route, adverse effects such as traffic increase, sunshine obstruction, It does not occur. In addition, by improving the sidewalks, the safety of traffic is secured more than now.
	(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) There are no objects such as the local archeological, historical, cultural, and religious heritage in or near the project site.
	(4) Landscape	(a) Is there a possibility that the project will adversely affect the local landscape? Are necessary measures taken?	(a) N	(a) Since the target bridge has not passed through the area requiring protection of the landscape, it is assumed that the influence on the landscape due to the existence of the bridge does not occur.
	(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 respected?	(a) N (b) N	(a) (b) Residents of ethnic minorities and indigenous peoples have not been confirmed at the project site and its surrounding areas.
	(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 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) (b) (c) (d) The working environment is appropriately developed based on the national legal system and international standards

5 others	(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) N (c) N	(a) For items evaluated as "A -" or "B -" in the impact assessment, including noise, vibration, turbid water, dust waste, etc., the mitigation measures during construction are formulated as environmental management plans, and monitoring is carried out. (b) (c) There will be no serious adverse effect on the natural environment or social environment due to implementation of the construction work.
	(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) N	(a) For items with a potential negative impact, an environmental monitoring program will be developed and stated in the EIA report. (b) The items, methods, frequencies, etc. of the monitoring program are described in the EIA report. (c) The monitoring framework is studied in the EIA report. It is desirable to reconsider and finalize the details of it when the details of the project are determined. (d) Monitoring plan and monitoring format are specified in this report (See Table 1-20, 1-21, 1-47, 1-48, 1-49, and 1-50).
Note	Reference to Checklist of Other Sectors	(a) Where necessary, pertinent items described in the Roads, Railways and 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) Y (b) N	(a) As construction of approach roads of the bridge is planned, related items shown in "Environmental Check List for Roads" are added as follow: 2 (2) (c), 2 (3) (1), 3 (2) (f) (b) There is a low-voltage transmission line, but the line is out of the the project area.
	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) -	(a) N/A

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 yet to be established in some areas, considerations should be made based on comparisons with appropriate standards of other countries (including Japan's experience

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 the project is located.

Annex 9

Environmental Management Plan (EMP) and Environmental Monitoring Plan (EMoP)

The Malagasy side shall conduct environmental mitigation measures and monitoring based on this Environmental Management Plan (EMP) / Environmental Monitoring Plan (EMoP). These plan may be updated during the detailed design stage.

1. Social and Environmental Monitoring

Item	Description	Location	Frequency	Responsibility	
				Operation	Oversight
Air Pollution	- Visual observation of coarse particulate and ash dust. - State of implementation of countermeasures. - Hearing survey	Project Area	Weekly (construction stage)	Contractor	MAHTP
			Biannually (Operation stage)	MAHTP	
Water Pollution (Surface water)	- Measurement of turbidness, pH, and others as specified in the monitoring form (see Annex 11). at upstream and downstream of the project area	Water Area (2 locations)	Bimonthly (construction stage)	Contractor	
			Biannually (Operation stage)	MAHTP	
	- Hearing surveyp	Project Area	Monthly (construction stage)	Contractor	
			Biannually (Operation stage)	MAHTP	
Waste Materials	- Monitor the state of implementation of waste disposal	Project Area	Weekly	Contractor	
Soil Pollution	- Inspection/maintenance of construction equipment for prevention of oil leakage.	—	Weekly		
Noise, vibration	- Noise level measurement - Hearing survey	Project Area	Monthly (construction stage)		
			Biannually (Operation stage)	MAHTP	
Bottom Sediment	- Inspection/maintenance of construction equipment for prevention of oil leakage.	—	Weekly	Contractor	

Ecosystem	- Visual confirmation of aquatic organisms, Hearing to neighboring residents	Project Area	Monthly		
	- Movement arousal before construction	Project Area	Before construction		
	- Restoration of riparian vegetation	Project Area	Before completion		
Existing Social Infrastructures and Services	- Monitoring of traffic jam situations	Project Area	Weekly		
Working Conditions	- State of implementation of safety measures - State of domestic water treatment and waste treatment	Project Area	Weekly		
Traffic Accidents	- Hearing of traffic accident situations and preventive measures based on hearing survey	—	Monthly		

2. Resettlement and Compensations

Item	Description	Timing	Responsibility	
			Operation	Oversight
Publicity announcement	To publicize a compensation policy and its schedule	After the Outline Design	MAHTP	ONE (Steering Committee)
Consensus of compensation	To build consensus on compensation amount and conclude agreement of payment	After the Outline Design	MAHTP	ONE (Steering Committee)
Implementation of compensation	To monitor progresses of compensation	After the Outline Design	MAHTP	ONE (Steering Committee)
Resettlement	To monitor progresses of resettlement	After the Outline Design	MAHTP	ONE (Steering Committee)
Socio-economic situation	To monitor socio-economic status of PAPs after resettlement/land acquisition(	After resettlement	MAHTP	MAHTP
Residents' Grievance	To monitor complaint of resident, if any To monitor state of complaint processing	After resettlement	MAHTP	MAHTP

Annex 10

ABBREVIATED RESETTLEMENT ACTION PLAN

（仏語版 M/D の Annex10 参照）

Environmental and Social Monitoring Form

Annex 11

The Malagasy side shall submit results of environmental monitoring to JICA by using this monitoring form on a quarterly basis as a part of Project Monitoring Report.

1. Environmental Monitoring

1.1. Air Quality

Monitoring Item	Monitoring Result during Report Period
Coarse particulate and ash dust (visual observation)	
Monitor the state of implementation of countermeasures (if necessary)	
Hearing survey (Peripheral People)	

1.2. Water Quality

Monitoring Item	Unit	Survey Point				Malagasy Standard	Survey Method	Remark (Situations of survey points)
		Mangoro Bridge		Antsapazana Bridge				
		Upstream	Downstream	Upstream	Downstream			
Turbidness	NTU					<25	NF EN ISO 7027-1	
pH (Temperature)	pH(° C)					6.0 -9.0	NF EN ISO 10523	
Chromium Hexavalent	mg/l					<0.2	Visible spectroscopy	
Nickel	mg/l					<2.0	Visible spectroscopy	
Arsenic	mg/l					<0.5	Visible spectroscopy	
Color	mg/l					<20	NF EN ISO 7887_D	
Water temperature	° C					-	-	
Electric conductivity(25℃)	μs/cm					<200	NF EN 27888	
Total Hardness	g/l in CaCO					<180.0	NF T 90-003	
Ammonium	mg/l in NH_4					<15.0	NF T 90-015-2	
Salt of nitric acid	mg/l in NO_3					<20.0	Visible spectroscopy	
Nitrite salt	mg/l in NO_2					<0.2	NF EN 26777	
Total Hydrocarbons	mg/kg					-	-	
Coliform group count	NPP/100ml					<100	NF EN ISO 9308-3	

1.3. Waste Materials

Monitoring Item	Monitoring Result during Report Period
Monitor the state of implementation of waste disposal	

1.4. Noise & Vibration (Mangoro Bridge only)

NOTE: Use from "1.9" for recording hearing investigation results

Item (unit)	Daytime	Nighttime	Baseline value at Mangoro Bridge				Local Standard	Remark (Situations of survey points)
			Daytime		Nighttime			
			Min.	Max	Min.	Max		
Noise level (dB)			43	111.8	43	106.2	—	
							—	

1.5. Soil Pollution / Bottom Sediment

Monitoring Item	Monitoring Result during Report Period
Inspection/maintenance of construction equipment (prevention of oil leakage)	

1.6. Ecosystem

Monitoring Item	Monitoring Result during Report Period
Visual confirmation of aquatic organisms, Hearing to neighboring residents	
Movement arousal before construction	
Restoration of riparian vegetation	

1.7. Existing Social Infrastructures and Services

Monitoring Item	Monitoring Result during Report Period
Traffic jam situations	

1.8. Working Conditions

Monitoring Item	Monitoring Result during Report Period
State of implementation of safety measures	
State of domestic water treatment and waste treatment	

1.9. Traffic Accidents

Date	Situation and cause of accicient	Correspondence	Result

1.10. Grievance regarding Environmental Impact

Date	Grievances	Correspondence	Result

2. Social Monitoring

2.1. Resettlement and Compensations

Monitoring Item	Scheduled Number	Progress in number		Progress in ratio		Completion date	Responsible Agency
		As of 11. 2019	As of 12. 2019	As of 11. 2019	As of 12. 2019		
Determination of PAPs							MAHTP
Consensus of compensation							MAHTP
Land acquisition (Mangoro)							MAHTP
Land acquisition (Antsapazana)							MAHTP
Resettlement (Mangoro)							MAHTP
Compensation (Mangoro)							MAHTP
Compensation (Antsapazana)							MAHTP

2.2. Resettlement Assistance (restoration of livelihoods and living standards)

Date	Contents	Activities	Result

2.3. Residents' Grievance

Date	Grievances	Correspondence	Result

4.3. テクニカルノート／覚書

Note technique

PROJET DE REHABILITATION DE PONTS SUR L'AXE ECONOMIQUE ANTANANARIVO – TOAMASINA EN REPUBLIQUE DE MADAGASCAR

Le Ministère des Travaux Publiques et des Infrastructures en République de Madagascar (ci-après dénommé "MTPI") et la JICA (ci-après dénommée "Equipe d'Etude") ont tenu une série de réunions techniques et discuté des questions nécessaires à la planification et à la conception des installations pour ce projet. Le 14 août 2018, les deux parties se sont convenues des descriptions ci-après :

1 Résultat d'analyse du trafic et prévision de la demande de trafic

1.1 Etude de trafic

L'Equipe d'Etude de la JICA a réalisé une étude de trafic le 24 et le 25 juillet. Partant de l'analyse des résultats de l'étude de trafic et des données existantes sur le trafic de la RN2, le trafic journalier moyen annuel en 2018 sur le tronçon routier des ponts planifiés est d'environ 1.700 véhicules sur le Pont de Mangoro et d'environ 2.000 sur le Pont d'Antsapazana. Ceux-ci seront définis comme le volume de trafic de base pour les prévisions de la demande de trafic. Ce volume de trafic ne comprend pas piétons et bicyclettes.

Selon les résultats de l'analyse de trafic, le volume de conception est prévu dans le prochain travail. L'année cible pour la conception est 2033. Le transport ferroviaire et le transport aérien seront considérés comme les modes de transport concurrents de la RN2 au cours de l'année de conception visée. Cependant, l'autoroute entre Antananarivo et Toamasina ne devrait pas être prise en compte dans l'étude des prévisions de la demande de trafic en raison du manque de clarté sur ce projet en ce moment.

2 Normes de conception des routes et ponts

Les Normes de conception utilisées pour ce projet sont les suivantes:

- Explanations and Operation for Road Structure Ordinance (2015 :JAPAN) ;
- Specifications for Highway Bridges (JAPAN) ;
- Structure Ordinance for River Management Facilities(2013 :JAPAN);

・Design Standards for Ministry of Public Works and Infrastructure (1996 :Madagascar);
・Geometric design List (MTPI);
・Manuel AASHTO etc.

3 Largeurs des routes et ponts

Ce Projet comprend la construction de plusieurs ponts et routes d'accès. La route du Projet comporte deux chaussées pour deux voies d'une largeur de 3,50m chacune. La largeur de la route d'accès est de 10,0m avec des bermes d'une largeur de 1,50m des deux côtés. Les ponts comportent des trottoirs, d'une largeur de 1,50m, des deux côtés des chaussées conformément aux normes malgaches. Toutefois, la largeur du pont pourrait changer suivant les résultats de l'étude de trafic et les contre-mesures des accidents de circulation.

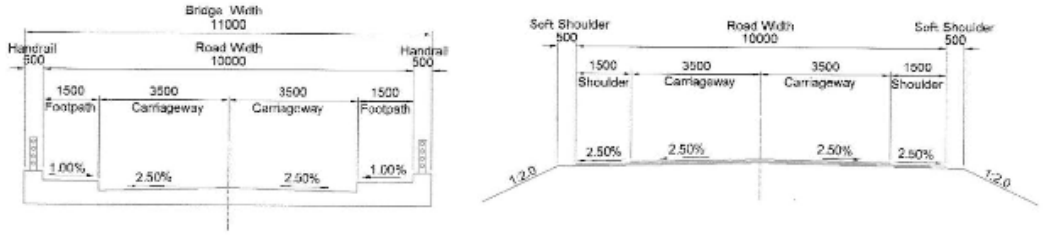


Figure1 Largeur standard（plan）（Coupe Pont・coupe courante（talus））

4 Planification et conception des routes

4.1 Conception géométrique et vitesse nominale

La vitesse nominale du Projet qui est de 80km/h est basée sur les normes standards des routes nationales à Madagascar. Cependant, le tracé géométrique de la route d'accès existante du Pont de Mangoro permet l'équivalent de 40km/h qui est la vitesse nominale des normes des routes japonaise due aux facteurs topographiques.

Dans ce projet, la vitesse nominale de la route d'accès au Pont de Mangoro sera supérieure à 50km/h selon les normes des routes japonaises si l'on prend en compte les normes géométriques malgaches ainsi que l'amélioration de la sécurité routière (le tracé géométrique sera amélioré par rapport à celui de la route existante). En outre, dans cette conception, la largeur de la chaussée dans les courbures sera élargie pour l'amélioration de la sécurité routière pour les poids lourds tout en améliorant la distance de visibilité.

Tableau : Vitesses nominales

Désignations	Mangoro	Antsapazana
Vitesse nominale	50km/h	80km/h
Route existante	40km/h	80km/h

4.2 Structure de la chaussée

La structure de la chaussée sur la route du projet sera décidée à partir des informations ci-après:

- Les charges à l'essieu sur la RN2 ;
- Les données sur le comptage du volume de trafic ;
- Les données géologiques au niveau du site du projet.

La période de conception standard des chaussées adoptée est de 15 ans selon les normes routières à Madagascar. Cependant, une révision prenant en compte le volume du trafic de poids lourds existant, le volume prévisionnel de trafics futurs, l'entretien ainsi que l'exploitation sera proposée si besoin.

4.3 Choix d'itinéraire (nouvel emplacement des ponts)

4.3.1 Généralités

L'emplacement des nouveaux Ponts de Mangoro et d'Antsapazana sera décidé à partir des paramètres les plus exhaustifs des considérations ci-après :

- La faisabilité économique du Don Non-remboursable japonais;
- L'accroissement des activités économiques;
- L'amélioration effective de la sécurité routière;
- La compatibilité des conditions environnementales et sociales (conditions de réinstallation, d'expropriation et de dédommagement)

4.3.2 Emplacement du Pont de Mangoro

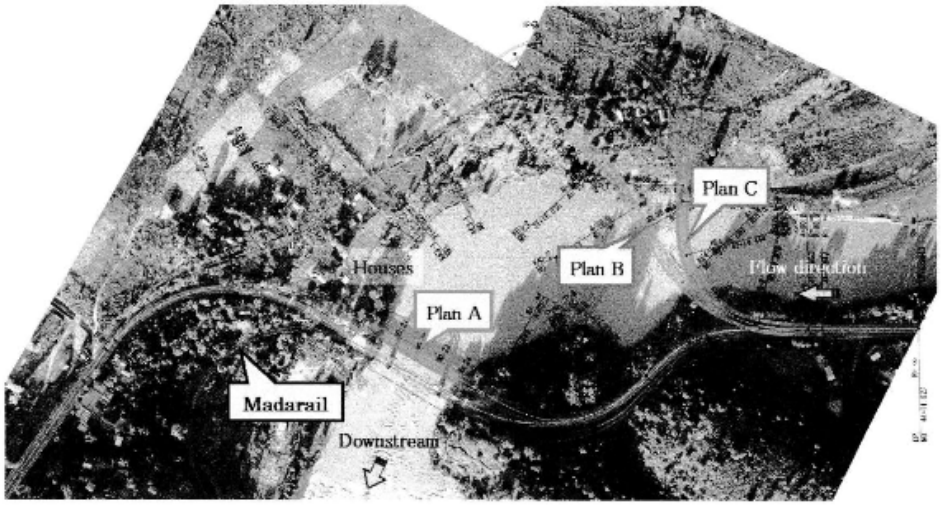
L'Equipe d'Etude de la JICA a fait part des résultats de la considération des trois itinéraires alternatives ci-dessous et a proposé le Plan A comme l'itinéraire recommandé à la suite de sa première enquête de terrain. Il a été confirmé que le MTPI n'a pas d'opinions divergentes à ce sujet (cf. pièce jointe pour plus de détails).

Plan A : Côté amont, à proximité du pont existant (itinéraire recommandé)

Plan B : Côté amont, éloigné du pont existant (A)

Plan C : Côté amont, éloigné du pont existant (B)

L'Equipe d'Etude de la JICA procèdera à la vérification et à la conception du Plan A au Japon. L'Equipe d'Etude rapportera au MTPI, si besoin, toutes modifications importantes lors de cette vérification.



4.3.3 Emplacement du Pont d'Antsapazana

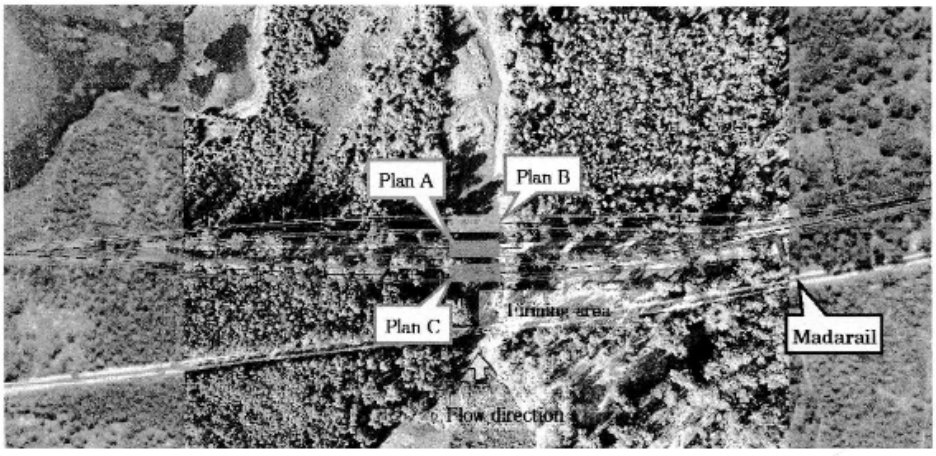
L'Equipe d'Etude de la JICA a fait part des résultats de la considération des trois itinéraires alternatives ci-dessous et a proposé le Plan A comme l'itinéraire recommandé à la suite de sa première enquête de terrain. Il a été confirmé que le MTPI n'a pas d'opinions divergentes à ce sujet (cf. pièce jointe pour plus de détails).

Plan A : Emplacement existant (plan recommandé)

Plan B : Emplacement en aval

Plan C : Emplacement en amont

L'Equipe d'Etude de la JICA procèdera à la vérification et à la conception du Plan A au Japon. L'Equipe d'Etude rapportera au MTPI, si besoin, toutes modifications importantes lors de cette vérification.



4.3.4 Résumé du nouvel emplacement du pont

Tableau: Emplacement des Ponts

Désignations	Mangoro	Antsapazana
Emplacements	Côté amont (Approximativement à 15m*) 〔conservation du pont existant〕	Reconstruction sur l'emplacement existant 〔enlèvement du pont existant〕

※Distance par rapport aux infrastructures existantes à considérer

5 Planification et conception des ponts

5.1 Généralités

La planification et conception des ponts de ce projet se feront en prenant en compte divers points de vue tels que les aspects structurels, la constructibilité (efficacité d'exécution), l'entretien, les impacts sur les aspects sociaux et environnementaux, ainsi que l'efficience économique.

5.1.1 Considérations pour les travaux d'entretien

Pour garantir la viabilité des travaux d'entretien des installations accordées dans le cadre de ce projet, une réduction ou maintien des charges des travaux d'entretien du MTPI/ARM doit être pris en considération par l'Equipe d'Etude pour la planification et la conception des nouveaux ponts de Mangoro et d'Antsapazana.

Il a été confirmé que le MTPI préfèrerait un pont en béton qui présenterait des avantages en termes de coûts d'entretien réduits et adaptabilité technique.

5.1.2 Nombre de piles immergées

L'Equipe d'Etude effectuera une analyse des cours d'eau (écoulement nominal, niveau d'eau maximal, etc.) dont les résultats devront être pris en compte pour la détermination du nombre de piles immergées ainsi que la disposition des travées pour les ponts de Mangoro et d'Antsapazana. On notera avec attention la requête du MTPI à la partie japonaise concernant l'évitement des risques liés à la prévention de crues suite à l'augmentation du nombre de piles par rapport aux situations actuelles.

Le MTPI est l'entité en charge de l'autorisation des travaux en cours d'eau pour les ponts concernés, y compris les piles immergées, culées et protection de berges, batardeaux, etc.

5.1.3 Hauteur de dégagement au-dessus du niveau d'eau maximal

Il n'y a ni règlements ni lois à Madagascar portant hauteur de dégagement qui se définit

comme un espace dégagé entre le niveau d'eau maximal et la surface inférieure de la superstructure du pont. Selon une probabilité d'occurrence adaptée à une analyse du niveau d'eau maximal, on recommande au MTPI les valeurs ci-dessous comme hauteur de dégagement (h);

Probabilité d'occurrence 1/50: h=1.5m ou plus

Probabilité d'occurrence 1/100: h=1.0m ou plus

Le MTPI a chargé l'Equipe d'Etude d'appliquer 1/100 comme probabilité d'occurrence pour l'analyse de cours d'eau de la Mangoro et de l'Antsapazana. En ce qui concerne la valeur souhaitable, le MTPI demande à l'Equipe d'Etude de choisir autant que possible une hauteur de dégagement plus grande (jusqu'à 1,5m)

5.1.4 Conception parasismique

Les ponts devront être suffisamment stabilisés contre les magnitudes sismiques maximales. De telles magnitudes devront être déterminées après mûre réflexion par l'Equipe d'Etude. Le coefficient sismique attendu (au 10 août 2018) est de 0.15, lequel sera adopté pour la conception des ponts sur la RN2 (JICA). Le coefficient sismique devra être révisé.

5.2 Planification et conception du Pont Mangoro

5.2.1 Longueur du pont

Selon la requête de Don Non-remboursable soumise par le MTPI, la longueur de pont proposée est de 100m. Des rapports correspondants établissant la base de la longueur de pont proposée sont inexistants. La longueur du Pont de Mangoro existant est de 80m environ. La longueur du nouveau pont devra, en principe, être assez longue pour permettre une zone d'écoulement transversale nécessaire.

5.2.2 Choix des types de structures

5.2.2.1 Type de superstructure

Un type de superstructures devra être étudié en parallèle avec une étude de la disposition des travées qui a un lien direct avec la prévention de crues. En ce qui concerne le nouveau Pont de Mangoro, dont la longueur est de 100m environ, un pont à 3 travées (33,3m x 3) ou 4 travées (25,0m x 4) serait le choix disponible en termes de rentabilité, sachant que le Pont de Mangoro existant comporte 3 travées. En général, le prix unitaire d'une superstructure augmente lorsqu'une augmentation de la longueur de travée est nécessaire.

Plusieurs types de ponts en béton seront choisis pour une étude comparative du type de superstructure. Concernant les principaux matériaux de la superstructure pour l'étude

comparative, les ponts en béton seront utilisés pour prendre en considération les coûts et techniques d'entretien.

5.2.2.2 Type d'infrastructure

Le type d'infrastructure doit être choisi en considérant minutieusement les influences des piles immergées sur l'écoulement de la rivière. Une profondeur scellée de semelle/structure de liaison en-dessous d'un lit de fleuve doit être convenablement renforcée pour éviter des situations d'instabilité de l'infrastructure due à l'érosion fluviale autour.

5.2.2.3 Type de fondation

Le type de fondation doit être choisi en considérant minutieusement les conditions pédologiques, la profondeur de la nappe phréatique, l'étendue des forces de réaction nominales, l'efficacité de construction, etc.

5.3 Planification et conception du pont d'Antsapazana

5.3.1 Longueur du pont

Selon la requête de Don Non-remboursable soumise par le MTPI, la longueur de pont proposée est de 30m. Des rapports correspondants établissant la base de la longueur de pont proposée sont inexistants. La longueur du Pont D'Antsapazana existant est de 30m environ.

La longueur du nouveau pont devra, en principe, être assez longue pour permettre une zone d'écoulement transversale nécessaire. L'Equipe d'Etude a effectué des enquêtes de terrain, des études topographiques, des études relatives au choix d'itinéraire, ainsi qu'une estimation préliminaire de l'écoulement nominale. A la suite de ces études, la longueur de pont proposée de 30m est jugée adéquate. L'Equipe d'Etude continue les études, y compris davantage d'analyses des cours d'eau qui permettront une optimisation de la longueur des ponts.

5.3.2 Choix des types de structures

5.3.2.1 Type de superstructure

Un type de superstructure devra être étudié en parallèle avec une étude de la disposition des travées qui a un lien direct avec la vulnérabilité et la prévention de crues. En ce qui concerne le nouveau pont d'Antsapazana, dont la longueur est de 30m environ, un pont à travée unique (30,0m x 1) ou à 2 travées (15,0m x 2) serait le choix disponible en termes de rentabilité, sachant que le pont d'Antsapazana existant comporte une seule travée. En général, le prix unitaire d'une superstructure augmente lorsqu'une augmentation de la longueur de travée

est nécessaire.

Plusieurs types de ponts en béton seront choisis pour une étude comparative du type de superstructure. Concernant les principaux matériaux de la superstructure pour l'étude comparative, les ponts en béton seront utilisés pour prendre en considération les coûts et techniques d'entretien.

5.3.2.2 Type d'infrastructure

Le type d'infrastructure doit être choisi en considérant minutieusement les influences des piles immergées sur l'écoulement de la rivière. Une profondeur scellée de structure de liaison en-dessous d'un lit de fleuve doit être convenablement renforcée pour éviter des situations d'instabilité de l'infrastructure due à l'érosion fluviale autour.

5.3.2.3 Type de fondation

Le type de fondation doit être choisi en considérant minutieusement les conditions pédologiques, la profondeur de la nappe phréatique, l'étendue des forces de réaction nominales, l'efficacité de construction, etc. Etant donné la profondeur de la couche portante, la fondation sur pieux est recommandée

5.3.2.4 .Démontage et mise en depôt du pont d'Antsapazana

Le MTPI propose que le démontage et la mise en depôt du pont d'Antsapazana éxistant par l'entreprise Japonaise n'est d'aucun problème si le nouveau pont est construit sur l'alignement de la route éxistante. Le MTPI est responsable du pont existant en cas ou le nouveau pont sera construit à côté

Le MTPI et l'équipe d'étude de la JICA , soussignés et sont d'accord sur la présente note.

Fait à Antananarivo le , 14 Août 2018

Pour le Ministère des Travaux Publics et desInfrastructures	Pour l'équipe d'étude de JICA
RAFIRINGA Eric Arius	Takashi MATSUO
Directeur Général des Travaux Publics	Co-Chief Consultant

（仮訳）

Technical Note

マダガスカル国
アンタナナリボ・トアマシナ間経済都市軸
橋梁整備計画準備調査

マダガスカル共和国公共事業インフラ省（以下、MTPI）と JICA 調査団（以下、調査団）は、プロジェクトの計画・設計で必要となる技術的内容に関して協議を重ね、2018 年 8 月 14 日、次に示す共通認識を構築した。

1　交通需要予測

調査団が実施した交通量調査および既存交通データの分析から、橋梁断面における日平均交通量は、マングル橋で約 1,700 台、アンツァパザナ橋で約 2,000 台であることが明らかとなった。

交通分析結果を用いて将来交通量推計を実施し計画交通量を算定する。計画年次は 2033 年とする。計画年次において供用されている交通モードは、鉄道および航空と想定する。なお、現段階において高速道路計画の進捗の行方は不透明であるため、計画年次においては供用されていないと想定する。

2　適用基準

適用設計基準を以下に示す。

・道路構造令の解説と運用（2015 年:日本）
・道路橋示方書（日本）
・河川管理施設等構造令（2013 年：日本）
・マダガスカル国公共事業インフラ省の設計基準（1996 年）
・幾何構造一覧(MTPI)を基準とする
・AASHTO 等の基準を参照する

3　道路および橋梁の幅員構成

本計画の対象道路は、橋梁区間とアプローチ道路区間で構成され、車線幅はいずれも W=3.5m とし車線数は 2 車線とする。アプローチ道路区間は、路肩幅員として W=1.50m を両側に確保し、道路幅員は全幅で W=10m とする。橋梁区間については、マダガスカ

ル国の国道における橋梁部の標準幅員を踏まえて車道部の両側に歩道を設置し、歩道幅員は W=1.5m を確保する。なお、橋梁部の幅員構成に関しては、交通安全対策や交通量調査結果により、変動する可能性がある。

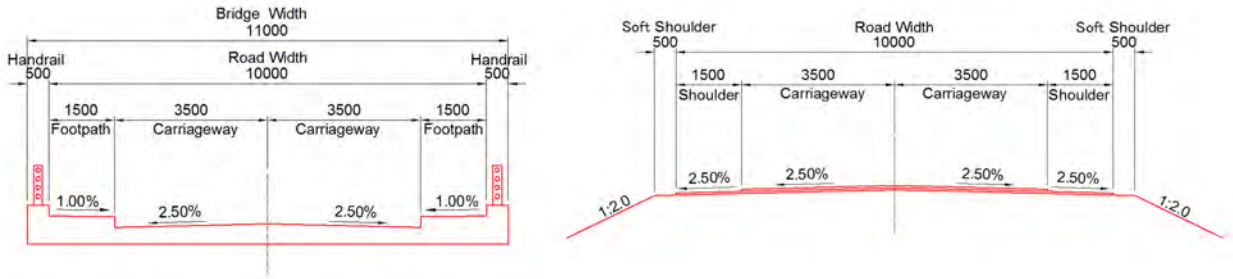


図 1 標準断面図（案）（橋梁部・土工部（盛土の場合））

4　道路計画・設計

4.1 幾何構造および設計速度

本計画の対象道路は、マダガスカル国の整備基準に基づき設計速度は 80km/h を基本とする。但し、マングル橋は、取付け道路区間における現況の設計速度が、地形上の制約により日本国の道路構造令で 40km/h 相当程度の線形となっている。本計画では、マダガスカル国の道路幾何構造法令を遵守した上で既存道路の走行安全性を向上することを目的とし、道路構造令における 50km/h 相当以上の設計速度を確保することを目標とする。（現況の設計速度は改善）。また、曲線区間において車線幅員の拡幅を行い視認性の確保や大型車の走行性改善に配慮した設計を行う。

表　設計速度

項　　目	マングル	アンツァパザナ
設計速度	50km/h	80km/h
現　況	40km/h	80km/h

4.2 舗装構造

舗装構造は下記を踏まえて決定する。

- 国道２号における大型車の軸重データ
- 交通量データ
- プロジェクトサイトの地質データ

舗装の設計期間は「マ」国の国道で採用されている 15 年を標準とする。ただし、交通状況や維持管理の実態を踏まえて検討を行い、必要に応じて提案を行う。

4.3 架橋位置（ルート選定）

4.3.1 基本事項

マングル橋ならびにアンツァパザナ橋の架橋位置（ルート）は、下記を踏まえて総合的に比較検討し決定する。

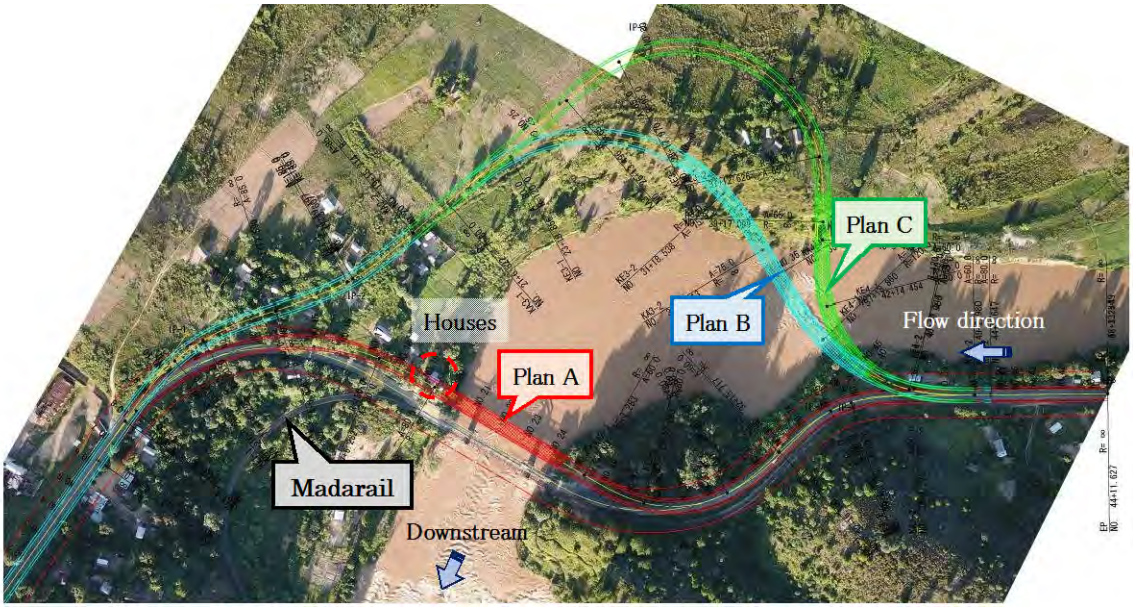
- 日本国無償資金協力として経済的に妥当であること
- 整備効果
- 改良線形の安全性や走行性、施工性
- 環境社会への適合性（住民移転、用地取得、補償の要否等）を

4.3.2 マングル橋の架橋位置

調査団は、第１回現地調査の内容を踏まえて以下の３ルート案の特徴を説明した。Plan A を推奨案として提案し、MTPI より異存がないことを確認した。（詳細は別添資料参照）

Plan A：上流側直近架替案〔推奨案〕
Plan B：上流側別ルート新設案
Plan C：上流側別ルート新設案

調査団は、Plan A に基づき国内解析を実施する。解析を行う過程で大きな修正が必要となる場合、調査団は MTPI に報告を行う。



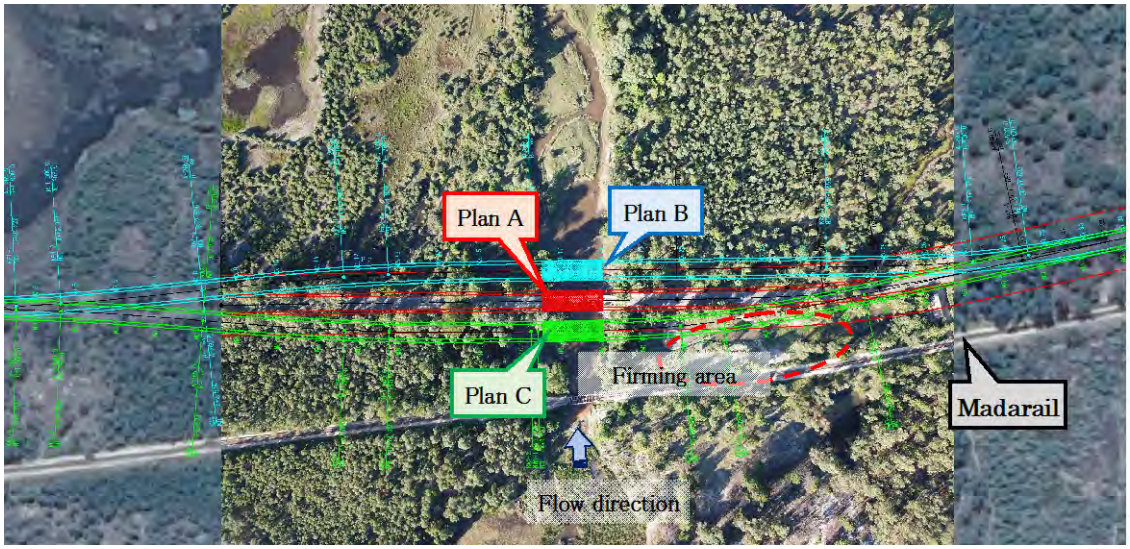
4.3.3 アンツァパザナ橋の架橋位置

調査団は、第１回現地調査の内容を踏まえて以下の３ルート案の特徴を説明した。Plan A を推奨案として提案し、MTPI より異存がないことを確認した。（詳細は別添資料参照）

Plan A：現況位置架替案〔推奨案〕

Plan B：下流側架替案

Plan C：上流流側架替案



調査団は、第 1 案に基づき国内解析を実施する。解析を行う過程で大きな修正が必要となる場合、調査団は MTPI に報告を行う。

4.3.4 架橋位置のサマリー

表　架橋位置

項　　目	マングル	アンツァパザナ
架橋位置	上流側（約 15m*シフト） 〔既設橋存置〕	現況位置に架け替える 〔既設撤去〕

※既設構造物との離隔について検討が必要。

5　橋梁計画・設計

5.1 基本事項

橋梁の計画ならびに設計は、構造性、施工性、維持管理面、環境社会配慮面、ならびに経済性について総合的に検討し決定する。

5.1.1 維持管理への配慮

本計画における橋梁計画ならびに橋梁設計では、MTPI ならびに ARM の維持管理に関するが負担（維持管理予算面および技術面）が軽減される、あるいは増加しないように配慮する。

MTPI は、維持管理費用が少なく、技術的にも対応しやすいコンクリート橋を要請している。

5.1.2 河川内橋脚の設置基数

調査団は河川解析（設計流量、設計水位等）を実施する。解析結果は、河川内橋脚数や支間割りの計画に用いる。MTPI は、新しいマングル橋の河川内橋脚数に関して、既存橋の橋脚数より増やすとは治水上のリスク増加に繋がると考えており、これを望んでいない。

MTPI は、本計画の対象橋梁に関する河川内工事（橋脚、橋台、護岸工、仮締切り工事等）の許可権限を有する。

5.1.3 桁下余裕高

マダガスカル国では、橋梁桁下面から計画高水位までの余裕高さ（桁下余裕高）に関する法令や基準はない。MTPI は桁下余裕高について次のように運用している。

生起確率が 1/50 の場合： 1.5m

生起確率が 1/100 の場合： 1.0m

MTPI は、本計画で建設する橋梁に対して、生起確率を 1/100 として河川諸元を検討することを要請している。この場合の最小桁下余裕高は 1.0m である。MTPI は、可能な範囲で桁下余裕高が 1.5m 確保されることを希望している。

5.1.4 耐震設計

橋梁は想定される地震力に対して安全となるように設計を行う。地震の大きさは、調査団が日本国内で検討し決定する。設計水平震度の大きさに関する 8 月 10 日時点の想定は、国道 2 号線の橋梁事業（JICA）で適用された値(0.15)としている。

5.2 マングル橋の計画および設計

5.2.1 橋長

要請された橋梁の橋長は、100m である。本橋長の妥当性について、マダガスカル側で調査は行っていないため、関連する報告書は作成されていない。既存橋の橋長は、およそ 80m である。

橋長は、必要な通水断面が確保でき、既存橋と同等以上の長さとすることを基本とする。JICA 調査団は、現地踏査、測量調査等、架橋位置の検討、ならびに流出量解析の結果、橋長を 100m 程度の妥当性を確認した。調査団は、日本国内で検討を行い、橋長の精査を行う。

5.2.2 橋梁形式

5.2.2.1 上部工形式

橋梁形式は、支間割り計画とともに検討する。新しいマングル橋の支間割に関して、橋長を 100m とした場合、既往実績から 3 径間（33.3m x 3）あるは 4 径間（25.0m x 4）がとすることが経済的と考えられる。既存のマングル橋は 3 径間である。一般に、上部構造は支間長が長くなると、単位長さ当たりの上部工工費が高くなる。

維持管理費用や現地の技術力を考慮して、コンクリート橋を比較対象とする。橋梁形式の比較は、数種類のコンクリート橋を比較案として用いる。

5.2.2.2 下部工形式

下部工形式は、河川への影響を考慮して適切な形式を選定する。河床が洗掘されて橋脚が不安定とならないように、河床への根入れを適切に計画する。

5.2.2.3 基礎工形式

基礎工形式は、地盤の硬軟、支持層までの深さ、荷重の規模、施工性などを踏まえて適切な形式を選定する。

5.3 アンツァパザナ橋の計画および設計

5.3.1 橋長

要請された橋梁の橋長は、30m である。本橋長の妥当性について、マダガスカル側で調査は行っていないため、関連する報告書は作成されていない。既存橋の橋長は、およそ 30m である。

橋長は、必要な通水断面が確保でき、既存橋と同等以上の長さとすることを基本とする。JICA 調査団は、現地踏査、測量調査等、架橋位置の検討、ならびに流出量解析の結果、橋長を 30m 程度の妥当性を確認した。調査団は、日本国内で検討を行い、橋長の精査を行う。

5.3.2 橋梁形式

5.3.2.1 上部工形式

橋梁形式は、支間割り計画とともに検討する。新しいアンツァパザナ橋の支間割に関して、橋長を 30m とした場合、既往実績から 1 径間（30.0m x 1）あるは 2 径間（15.0m x 2）がとすることが経済的と考えられる。既存のアンツァパザナ橋は 1 径間である。一般に、上部構造は支間長が長くなると、単位長さ当たりの上部工工費が高くなる。

維持管理費用や現地の技術力を考慮して、コンクリート橋を比較対象とする。橋梁形式の比較は、数種類のコンクリート橋を比較案として用いる。

5.3.2.2 下部工形式

下部工形式は、河川への影響を考慮して適切な形式を選定する。河床が洗掘されて橋脚が不安定とならないように、河床への根入れを適切に計画する。

5.3.2.3 基礎工形式

基礎工形式は、地盤の硬軟、支持層までの深さ、荷重の規模、施工性などを踏まえて適切な形式を選定する。支持層となることが見込まれる土層の深度が深いことから、杭基礎とすることが想定される。

5.3.2.4 既存のアンツァパザナ橋の撤去

MTPI は、既存のアンツァパザナ橋の撤去について、架橋位置によらず、日本側で実施するよう要請する。MTPI は、撤去された橋梁上部工を再利用し、インフラ整備を推進させる。

上記内容について、MTPI と JICA 調査団はお互いに合意した。

2018 年 8 月 14 日、アンタナナリボ

Ministry of Public Works and Infrastructure	JICA Study Team
Mr. RAFIRINGA Eric Arius	Mr. Takashi MATSUO
Director General of Public Works	Co-Chief Consultant

（覚書）

1．先方負事項の確認（MD で署名した以外の内容）

MEMORANDUM DE CONFIRMATION DES OBLIGATIONS SPECIFIQUES DES PAYS PARTENAIRES

Procès-verbal des discussions sur l'Etude préparatoire pour le Projet d'Amélioration des Ponts sur l'Axe économique Antananarivo – Toamasina en date du 16 juillet 2018

OBLIGATIONS SPECIFIQUES DU MINISTERE DES TRAVAUX PUBLICS ET DES INFRASTRUCTURES

No.	Eléments	Processus	Calendrier de mise en œuvre	Ministères Responsables
1	Voir la possibilité de déplacement d'une installation routière connexe existante (Câble optique de communication de TELMA)	MTPI ↓ TELMA ↓ MTPI	Avant la notification d'appel d'offres aux entreprises soumissionnaires	MTPI
2	Fournir des informations en rapport aux règles générales de la circulation pendant la durée du projet	MTPI ↓ GENDARMERIE NATIONALE ↓ MTPI	Durant le projet	MTPI

L'Equipe d'Etude de la JICA et le Ministère des Travaux Publics et des infrastructures (MTPI) ont confirmé le contenu des éléments ci-dessus (processus, calendrier de mise en œuvre, ministères responsables) nécessaires au démarrage des projets futurs (avant l'appel d'offre et la mise en œuvre du projet) et confirmé par le Mémorandum d'Entente que le MTPI opèrera dans la sureté et la régularité.

Fait à Antananarivo le 20 Août 2018

Mr. Takashi MATSUO
Co-Chef d'Equipe des Consultants
Etude Préparatoire
Mission de la JICA

Mr .RANDRIANANDRASANA Hajaniaina
Secrétaire Général
Ministère des Travaux Publics et des Infrastructures (MTPI)

２．書類の使用言語の確認

(Mémorandum)

Langue utilisée dans chaque document

No.	Désignation	Preparé par	Langue	
			Français	Anglais
I	**ÉTAPE DE L'ENQUÊTE PRÉPARATOIRE**			
1.	Rapport d'enquête de terrain	Consultant		○
2.	Projet de rapport d'enquête préparatoire (projet de rapport final) Remarque : Contenus techniques (Dessins techniques, etc.)	Consultant	○	○ (Note)
3.	Rapport d'étude préparatoire (rapport final) Note: Contenus techniques (Dessins techniques, etc.)	Consultant	○	○ (Note)
II	**ÉTAPE DE MISE EN ŒUVRE**			
1.	**Documents concernant l'Accord de services de consultance**			
1.1	Accord pour les services de consultance	Consultant	○	
1.2	Recommandation du consultant	JICA	○	
1.3	Documents pour l'arrangement bancaire (B/A, A/P)	Banque	○	
1.4	Documents pour le paiement	Consultant	○	
2.	**Documents pour le Contrat avec le fournisseur**			
2.1	Annonce de l'appel d'offres	Consultant	○	○
2.2	Documents d'appel d'offres			
	Volume I Conditions d'appel d'offres et contrat	Consultant	○	○
	Partie I: Instructions aux soumissionnaires	Consultant	○	○
	Partie II: Formes d'appel d'offres	Consultant	○	○
	Partie III: Forme du contrat	Consultant	○	
	Volume II Cahier des charges	Consultant	○	○
2.3	Questions et réponses par rapport aux documents d'appel d'offres	Soumissionnaire / Consultant	○	○
2.4	Document de soumission des offres	Soumissionnaire (Entreprise prestataire)	○	○
2.5	Rapport d'évaluation des offres	Consultant	○	○
2.6	Contrat d'exécution	Entreprise prestataire	○	
2.7	Documents pour l'arrangement bancaire (B/A, A/P)	Banque	○	
2.8	Documents pour paiement	Entreprise prestataire	○	
2.9	Attestation d'achèvement	Consultant / Maître d'oeuvre	○	
2.10	Documents techniques pour approbation	Documents techniques pour approbation	○	○

Remarque : Une langue utilisée à l'étape de la mise en œuvre doit suivre celle utilisée dans l'échange de notes (E/N), indépendamment du tableau ci-dessus.

La mission JICA (l'Equipe des Consultants) et les représentants du Ministère de Travaux Publics et des Infrastructures (MTPI) ont confirmé les Langue utilisée dans chaque document ci-dessus.

Fait à Antananarivo le 20 Août 2018

Mr. Takashi MATSUO
Co-Chef d'Equipe des Consultants
Etude Préparatoire
Mission de la JICA

Mr. RANDRIANANDRASANA Hajaniaina
Secrétaire Général
Ministère des Travaux Publics et des Infrastructures (MTPI)

5. 参考資料

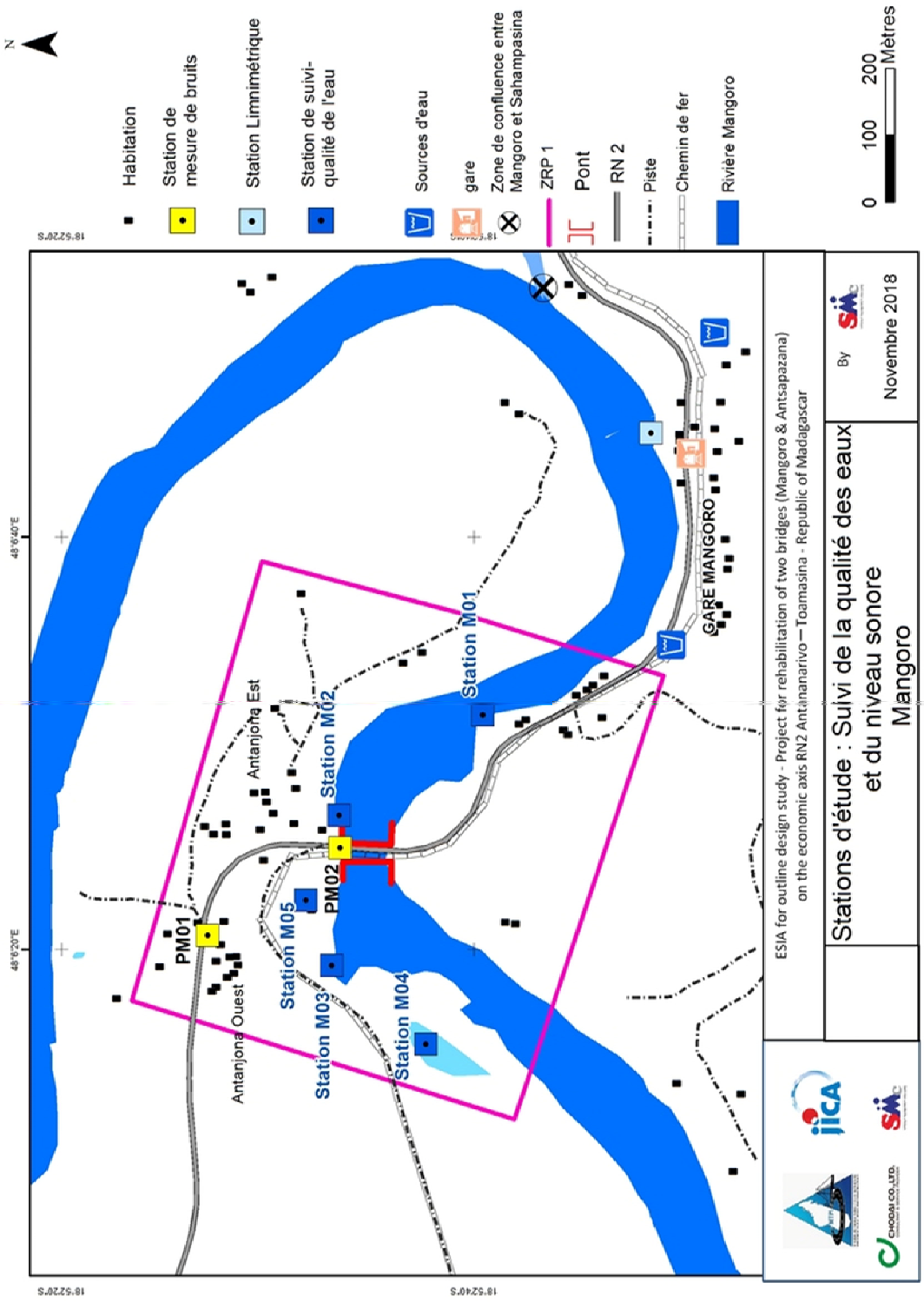
5.1. 自然環境ベースライン調査結果

自然環境ベースライン調査結果

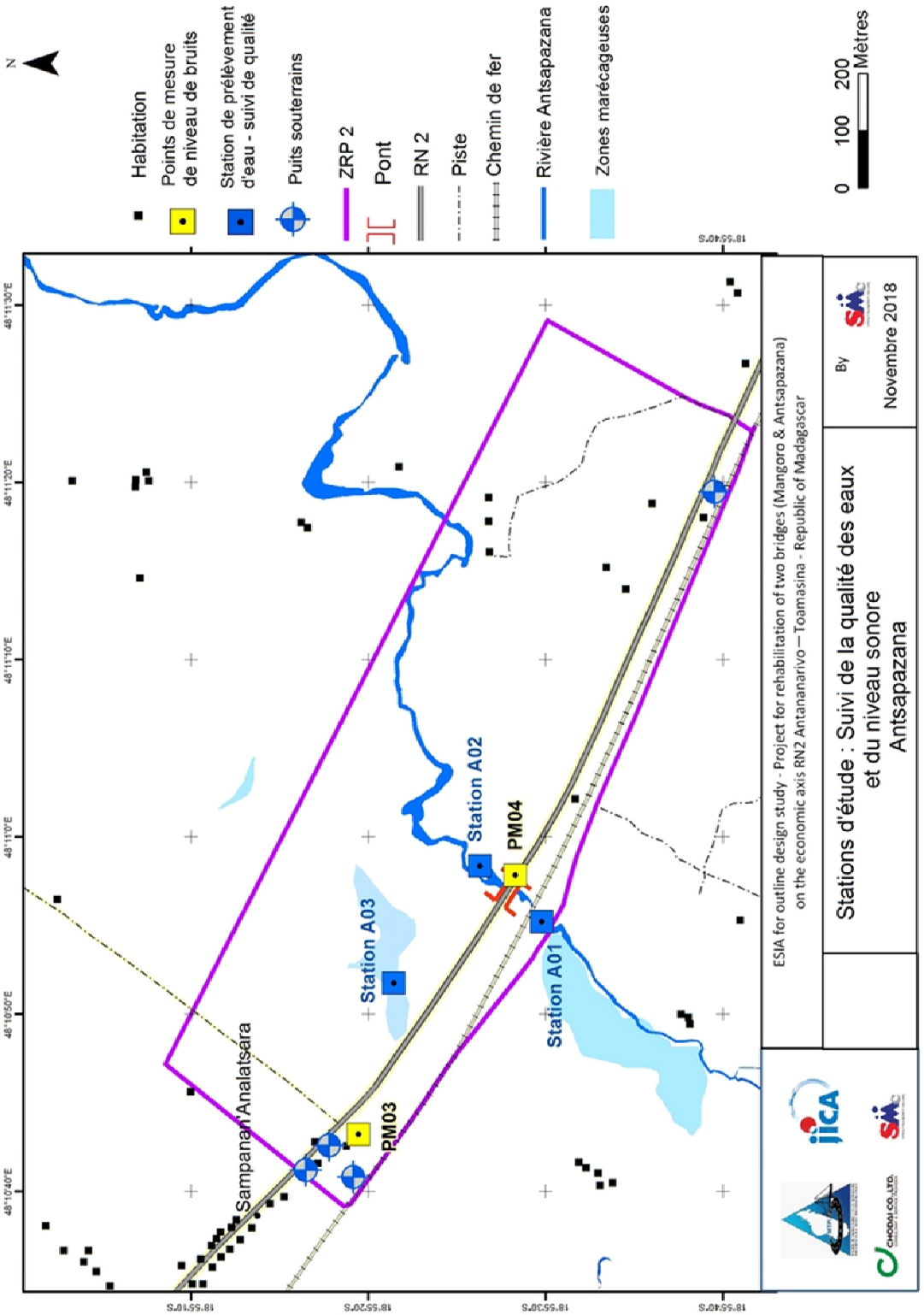
目　次

調査位置図

マングル橋


N
Habitation
Station de mesure de bruits
Station Limnimétrique
Station de suivi-qualité de l'eau
Sources d'eau
gare
Zone de confluence entre Mangoro et Sahampasina
ZRP 1
Pont
RN 2
Piste
Chemin de fer
Rivière Mangoro
0 100 200 Mètres
Station M01
Station M02
Station M03
Station M04
Station M05
PM01
PM02
Antanjona Est
Antanjona Ouest
GARE MANGORO
ESIA for outline design study - Project for rehabilitation of two bridges (Mangoro & Antsapazana) on the economic axis RN2 Antananarivo—Toamasina - Republic of Madagascar
Stations d'étude : Suivi de la qualité des eaux et du niveau sonore Mangoro
By
Novembre 2018
JICA
CHODAI CO.,LTD.

アンツァパザナ橋


N
Habitation
Points de mesure de niveau de bruits
Station de prélèvement d'eau - suivi de qualité
Puits souterrains
ZRP 2
Pont
RN 2
Piste
Chemin de fer
Rivière Antsapazana
Zones marécageuses
0 100 200 Mètres
Station A01
Station A02
Station A03
PM03
PM04
Sampanan'Analatsara
ESIA for outline design study - Project for rehabilitation of two bridges (Mangoro & Antsapazana) on the economic axis RN2 Antananarivo – Toamasina - Republic of Madagascar
Stations d'étude : Suivi de la qualité des eaux et du niveau sonore Antsapazana
By
Novembre 2018
jica
CHODAI CO.,LTD.

1. 調査目的

ベースライン調査は、事業により影響を受ける可能性がある特定の環境要素の現況を把握するために実施した。

2. 調査項目

ベースライン調査の実施項目は、ONE による本事業の EIA のスクリーニング時において、本事業によって影響が懸念された 3 つの環境要素（騒音、水質、生態系）とした。また、スクリーニングにおいて影響は懸念されないとされた大気質についても文献による調査を実施した。

3. 調査結果

3.1. 騒音調査

事業予定地周辺における環境騒音の発生源としては、道路や鉄道の交通、人為的活動、自然の騒音（動物相、動植物、風、雨等）が挙げられる。工事中にはこれらの環境騒音に建設活動に関連する騒音が加わる。なお、建設機械から発生する騒音レベルは、工種、時期、使用重機の稼動状況により変動する。

3.1.1. 測定方法

騒音の測定は、連続する 24 時間、日中（午前 6 時～午後 5 時)、夜間（午後 5 時～午後 10 時)、深夜（午後 10 時～午前 6 時）で行われ、Trotec 社の測定機器（SL 300 model）を用いて行われた。

3.1.2. 測定地点

調査は事業が行われるマングル橋（以下、「マ」橋」）ならびにアンツァパザナ橋（以下、「ア」橋）とその周辺地区において、各地区で保全対象（集落や自然生態系等）が近く、影響が懸念される場所において実施された。

表 3-1　測定地点及び概況

調査地区	測定地点	地点概況
「マ」橋	PM01	「マ」橋に最も近接する村（Antanjona）の公共広場
	PM02	「マ」橋近接住居前
「ア」橋	PM03	RN2 と Fasan'ny Mahery Fo 通りの交差部（Sampananalatsara 村）
	PM04	「ア」橋端

3.1.3. 測定結果

事業対象地周辺における現地調査においては、昼夜問わず 100dB 以上の最大騒音（最低は 30～44dB）が測定された。深夜に PM02 地点で最大値（123.7dB）が確認されたが、これは夜行列車

の走行に伴う振動音である。

騒音測定の結果を表 3-2～表 3-4 に示す。また、騒音が生活に与える影響及び WHO のガイドライン値を表 3-5～表 3-6 に示す。

表 3-2　測定結果（昼間）

Receiver Location		Day time		Observations
		Min (dB)	*Max (dB)*	
PM01	Public square in the village of Antanjona,	30.8	109.3	The maximum is due to the passage of a double axle-truck going up the slope; The minimum of 30.8 corresponds to the ambient noise of the village and surroundings Ambient temperature: between 23 and 24 ° C and calm wind (where smoke rises vertically)
PM02	Mangoro Bridge entry point (Tanà to Tamatave)	43.3	111.8	The maximum is generated by the passage of a 4 axle-truck with 2 loaded containers and the resonance of the metal shock at the entrance of the bridge; The minimum of 43.3 is mainly background noise from runoff of river water Ambient temperature: between 23 and 24°C and calm wind (where smoke rises vertically)
PM03	RN2 and and Fasan'ny Mahery Fo road junction at Sampananalatsara village	42.1	102.7	The maximum is generated by the passing of a tanker truck at the bridge entrance to Moramanga The minimum being the ambient noise with rustle of the leaves of trees Ambient temperature 23.4°C; rather calm wind (the wind tips the smoke)
PM04	Antsampazana bridge exit point (Tanà to Tamatave)	35.6	109.3	The maximum is due to the passage of 3 trucks, two buses (a Sprinter Mercedes car and a Mazda minibus) to Moramanga, at the exit of the bridge, the noise seems persistent due to the existence of the turn; The minimum corresponds to the background noise in rural areas, quiet moment without passing car Ambient temperature 23.6°C; rather calm wind

表 3-3　測定結果（夜間）

Receiver Location		Evening time		Observations
		Min (dB)	*Max (dB)*	
PM01	Public square in the village of Antanjona,	39.3	101.5	The maximum is generated by the passage of an empty truck at high speed down the slope to Moramanga; The minimum corresponds to the ambient noise of the village. Ambient temperature 22.8°C and calm wind
PM02	Mangoro Bridge entry point (Tanà to Tamatave)	43.0	106.2	The maximum is due to the passage of a 4-axle truck at the exit of the bridge; The minimum corresponds to the quiet moment at the bridge. Ambient temperature 22.2°C; the wind is rather calm (the wind tips the smoke)
PM03	RN2 and and Fasan'ny Mahery Fo road junstion at Sampananalatsara village	38.3	93.6	The maximum is given by the passage of a scooter-type motorcycle　(towards Antananarivo); The minimum is a quiet moment without passing a car with rustle of leaves. Ambient temperature: 22 ° C and calm wind (where smoke rises vertically)
PM04	Antsampazana bridge exit point (Tanà vers Tamatave) at 4m from the RN2	35.3	106.9	The maximum is generated by the passage of a tiller; The minimum corresponds to the ambient noise of rural areas without passing vehicles Ambient temperature 22.1 ° C and calm wind (where smoke rises vertically)

表 3-4　測定結果（深夜）

Receiver Location		Evening time		Observations
		Min (dB)	*Max (dB)*	
PM01	Public place Antanjona-7m de la RN2	30.8	106.2	The maximum is due to the passage of a 250cc motorcycle running down the slope The minimum is the ambient noise of the rural environment Ambient temperature between 21 and 22 ° C and the wind is rather calm (the wind inclines the smoke)
PM02	Mangoro Bridge entry point (Tana to Tamatave)	44.3	123.7	This maximum corresponds to the noise of a night train (1 locomotive with 6 tank cars) passing about 4m from the sound level meter The minimum is ambient noise without passage of car with runoff of river water and noise of nocturnal insects (cicada and cricket), continuous noise with the sound of the small waterfall in the middle of the water Ambient temperature 21.9 ° C and calm wind (smoke rises vertically)
PM03	RN2 and and Fasan'ny Mahery Fo road junstion at Sampananalatsara village	*UN	109.0	The maximum corresponds to the passage of 2 single deck trucks and a Sprinter bus which follow one another The almost unknown minimum corresponds to the background noise during night, without wind, without noise of insects Ambient temperature 16 ° C and calm wind
PM04	Antsampazana bridge exit point (Tanà vers Tamatave) at 4m from the RN2	36.0	98.5	The maximum is due to the passage of a 1 truck with 3 axles The minimum being background noise with intermittent bird whistling Ambient temperature 14, 7 ° C and calm morning wind

注）使用機材の性能により、30dB 以下は測定不能

表 3-5　騒音が生活や健康に与える影響

No.	影響	状況
1	Discomfort caused to the conversation 会話妨害（会話に不快感を与える）	The speaker must make efforts of locution starting from 65 dBA threshold max 65dB 以上になると、聞こえにくくなる。
2	Temporary loss of hearing （一時的な難聴）	Occurring after exposure to a high level of sound from 135 dBA 最大値が 135dB の騒音があった場合
3	Permanent loss of hearing （聴覚の喪失）	When exposures are prolonged, the hair cells may have lesions starting at an equivalent sound level of 90 dBA for 8 hours. 90dB 以上の騒音が 8 時間以上続いた場合
4	Noise, stress, loss of concentration （ストレスや集中力の低下）	―

出展）Organisation Mondiale de la Santé (OMS) 1980. Critères d'hygiène de l'environnement. Le Bruit

表 3-6　WHO 環境騒音ガイドライン

用途	環境影響	L_{Aeq} (dB)	時間 (hours)	L_{Amax} (dB)
屋外	強い不快感	55	16	
	中程度の不快感	50	16	
屋内	会話妨害	35	16	
	睡眠妨害	30	8	45
寝室 屋外	睡眠妨害（窓開で測定した屋外値）	45	8	60
屋内 屋外	聴力損失	70	24	110

3.2. 水質調査

対象予定地を流れるマングル川及びアンツァパザナ川は周辺住民の生活用水の水源として使用されている。「マ」橋では橋梁の下部工、「ア」橋では迂回路の建設等のため、一定期間において河川内で作業が行われ、予定地周辺には、作業ヤード及びベースキャンプが設置されることから表流水への影響が懸念される。

3.2.1. 調査方法

水試料のサンプリングは、国立環境研究センター（CNRE）の規則に従って行われた。採水されたサンプルは直ちに低温状態で、分析機関へ輸送され、表 3-7 に示す項目について分析が行われた。

表 3-7　水質調査における分析項目

項目	分析項目
地表水	濁度、pH（温度）、六価クロム、ニッケル、ヒ素、色度、水温、電気伝導率（温度補償:25°C)、全硬度、アンモニウム、硝酸塩、亜硝酸塩、全炭化水素、大腸菌群
地下水	色度、濁度、pH（温度）、六価クロム、全硬度、ニッケル、ヒ素、全リン、BOD（5 日後）、塩分濃度、中和滴定、アンモニウム、硝酸塩、亜硝酸塩、水温、電気伝導率、（温度補償:25°C)

3.2.2. 調査地点

地表水の調査地点は、各調査地区で橋梁の上流及び下流に数箇所設置した。また、地下水の調査地点は事業予定地に近接する集落内の井戸を対象にそれぞれ 1 地点とした。

調査地点及びその概況は表 3-8 に示す。

表 3-8　測定地点及び概況

調査地区	測定地点	項目	地点概況
「マ」橋	M01	地表水	マングル川左岸、「マ」橋上流
	M02	地表水	マングル川右岸、「マ」橋上流
	M03	地表水	マングル川右岸、「マ」橋下流
	M04	地表水	マングル川右岸、「マ」橋下流に位置するため池
	M05	地下水	マングル川右岸、「マ」橋下流にある私設井戸
「ア」橋	A01	地表水	アンツァパザナ川左岸、「ア」橋上流
	A02	地表水	アンツァパザナ川右岸、「ア」橋下流
	A03	地表水	マングル川左岸に位置するため池
	A04	地下水	マングル川左岸の集落にある施設井戸

3.2.3. 調査結果

地表水について、マングル川及びアンツァパザナ川それぞれの採水調査の結果、「マ」橋の M01 および M03、ならびに「ア」橋の A01 および A02 において濁度が、「マ」橋、「ア」橋ともに色度でマダガスカル国（以下、「マ」国）の基準値を超過していることが確認された。また、大腸菌群についても両橋（M02, M03, A02）で基準値の超過が確認された。「ア」橋周辺の溜池（A03）では、pH の基準値を満足できていないことが確認された。

詳細な現地調査結果を表 3-9～表 3-11 に示す。

表 3-9　地表水調査結果（マングル橋）

項目	単位	調査地点[注]				マ国基準	調査方法
		M01	M02	M03	M04		
濁度	NTU	31	20	29	3.7	<25	NF EN ISO 7027-1
pH（温度）	pH (°C)	6.8 (20.4)	6.8 (20.5)	7.0 (20.3)	6.9 (6.9)	6.0 -9.0	NF EN ISO 10523
六価クロム	mg/l	< 0.05	< 0.05	< 0.05	< 0.05	<0.2	可視分光法
ニッケル	mg/l	< 0.05	< 0.05	< 0.05	< 0.05	<2.0	可視分光法
ヒ素	mg/l	< 0.01	< 0.01	< 0.01	< 0.01	<0.5	可視分光法
色度	mg/l	>70	70	60	30	<20	NF EN ISO 7887_D
水温	°C	19.3	19.1	19.4	19.6	-	-
電気伝導率（温度補償:25°C)	µs/cm	20	18	16	23.0	<200	NF EN 27888
全硬度	g/l in CaCO	32	58	22	8	<180.0	NF T 90-003
アンモニウム	mg/l	<0.05	<0.05	<0.05	<0.05	<15.0	NF T 90-015-2
硝酸塩	mg/l	0.3	0.3	0.4	0.1	<20.0	可視分光法
亜硝酸塩	mg/l	<0.1	<0.1	<0.1	<0.1	<0.2	NF EN 26777
全炭化水素	mg/kg	<LMQ		<LMQ		-	-
大腸菌群	NPP/ 100ml		700	500		<100	NF EN ISO 9308-3

注）M01, M02, M03 は河川、M04 は溜池

表 3-10　地表水調査結果（アンツァパザナ橋）

項目	単位	調査地点			マ国基準	調査方法
		A01	A02	A03		
濁度	NTU	29	26	17	<25	NF EN ISO 7027-1
pH（温度）	pH (°C)	6.3 (20.5)	6.3 (20.2)	5.8 (20.4)	6.0 -9.0	NF EN ISO 10523
六価クロム	mg/l	<0.05	<0.05	<0.05	<0.2	可視分光法
ニッケル	mg/l	<0.05	<0.05	<0.05	<2.0	可視分光法
ヒ素	mg/l	<0.01	<0.01	<0.01	<0.5	可視分光法
色度	mg/l	>70	>70	30	<20	NF EN ISO 7887_D
水温	°C	20.5	19.7	19.4	-	-
電気伝導率（温度補償:25°C)	µs/cm	27	15	3	<200	NF EN 27888
全硬度	g/l	24	10	16	<180.0	NF T 90-003
アンモニウム	mg/l	0.1	<0.05	0.1	<15.0	NF T 90-015-2
硝酸塩	mg/l	0.2	0.1	1.0	<20.0	可視分光法
亜硝酸塩	mg/l	<0.1	<0.1	<0.1	<0.2	NF EN 26777
全炭化水素	mg/kg		<LMQ	<LMQ	-	-
大腸菌群	NPP/ 100ml		200	<15	<100	NF EN ISO 9308-3

注）A01, A02 は河川、A03 は溜池

地下水については、「マ」橋、「ア」橋周辺の集落内にある井戸の採水を行った。その調査の結果、「マ」橋、「ア」橋ともに国内基準を満足していることが確認された。

表 3-11　地下水調査結果（マングル橋 M05 およびアンツァパザナ橋 A04）

項目	単位	調査地点		マ国基準	調査方法
		M05	A04		
色度	mg/l	14	12	<20	NF EN ISO 7887_D
濁度	NTU	2.2	1.7	<25	NF EN ISO 7027-1
pH（温度）	pH (°C)	6.8 (20)	6.9 (20.4)	6.0 -9.0	NF EN ISO 10523
六価クロム	mg/l	< 0.05	< 0.05	<0.2	可視分光法
全硬度	g/l	0.2	0.3	<180.0	NF T 90-003
ニッケル	mg/l	< 0.05	< 0.05	<2.0	可視分光法
ヒ素	mg/l	< 0.01	< 0.01	<0.5	可視分光法
全リン	mg/l	0.01	0.04	<10.0	NF EN ISO 6878
BOD（5 日後）	mg/l	0.63	0.53	<50	NF EN 1899-2
塩分濃度	mg/l	0.00	0.00	-	導電率
中和滴定	meq/l	< 0.05	< 0.05	-	NF EN ISO 9963-1
アンモニウム	mg/l	< 0.01	< 0.01	<15.0	可視分光法
硝酸塩	mg/l	0.2	0.5	<20.0	可視分光法
亜硝酸塩	mg/l	< 0.05	< 0.05	<0.2	可視分光法
水温	°C	19.9	19.6	-	-
電気伝導率（温度補償:25°C)	µs/cm	21.0	21.0	<200	NF EN 27888

3.3. 生態系調査

3.3.1. 調査方法

生態系の調査は、文献による調査、現地踏査、ならびに事業予定地の周辺住民へのヒアリングにより実施した。

3.3.2. 調査地点

現地調査の対象は、「マ」橋ならびに「ア」橋からそれぞれ半径 500m の範囲とした。

3.3.3. 調査結果

調査の結果、14 種の木本植物、17 種の草本植物、13 種の鳥類、15 種の哺乳類、2 種の爬虫類、9 種の水生動物を確認した。

「International Union for Conservation of Nature（IUCN)」のレッドリストに記載される貴重な種の直接確認はなかった。

調査結果は表 3-12～表 3-17 に示すとおりである。

表 3-12　確認種一覧（木本植物）

FAMILY	GENUS	SPECIES	M	A	NOTES
Myrtaceae (フトモモ)	*Eucalyptus* (ユーカリノキ)	*camaldulensis* (Eucalyptus camaldulensis)	○		reforestation species
Myrtaceae (フトモモ)	Eucalyptus (ユーカリノキ)	robusta (オオバユーカリ)	○	○	
Pinaceae (マツ)	Pinus (マツ)	kesyia (カシヤマツ)	○	○	
Pinaceae (マツ)	Pinus (マツ)	patula (パツラマツ)	○		
Lauraceae (クスノキ)	Cinnamomum (クスノキ)	camphora (クスノキ)	○		Exist in the arboretum
Combretaceae (シクンシ)	Terminalia (モモタマナ)	mantaly (Terminalia mantaly)	○		
Cupressaceae (ヒノキ)	Cupressus (イトスギ)	lusitanica (Cupressus lusitanica)	○		
Anacardiaceae (ウルシ)	Mangifera (マンゴー)	Indica (マンゴー)	○	○	Fruit trees around dwellings
Rosaceae (バラ)	Eriobotrya (ビワ)	japonica (ビワ)	○		
Sapindaceae (ムクロジ)	Nephelium (ランブタン)	litchi (Nephelium litchi)		○	Private plantation plot
Myrtaceae (フトモモ)	Eugenia (Eugenia)	jambolana (Eugenia jambolana)	○	○	In the riparian formation
Myrtaceae (フトモモ)	Eugenia (Eugenia)	Eugenia sp. (Eugenia 属の一種)	○		
Sapotaceae (アカテツ)	Manilkara (Manilkara)	Manilkara sp. (Manilkara 属の一種)	○		
Myrtaceae (フトモモ)	Psidium (バンジロウ)	guajava (バンジロウ)	○	○	Fruit trees around dwellings

M：「マ」橋周辺地域　　A：「ア」橋周辺地域

表 3-13　確認種一覧（草本植物）

FAMILY	GENUS	SPECIES	M	A	NOTES
Asteraceae (キク)	Psiadia (Psiadia)	altissima (Psiadia altissima)	○	○	Mix up with reforestation
Rosaceae (バラ)	Rubus (キイチゴ)	malachobatus (Rubus malachobatus)	○	○	In the glades, especially around the National Road (RN2)
Aphloiaceae (Aphloiaceae)	Aphloia (Aphloia)	theiformis (Aphloia theiformis)	○		In the riparian formation
Verbenaceae (クマツヅラ)	Lantana (ランタナ)	camara (シチヘンゲ)	○	○	Within glades
Zingiberaceae (ショウガ)	Aframomum (Aframomum)	angustifolium (Aframomum angustifolium)	○	○	In marshy areas
Ericaceae (ツツジ)	Erica (エリカ)	sp (エリカ属の一種)	○	○	In valleys and open spaces
Melastomataceae (ノボタン)	Clidemia (Clidemia)	hirta (アメリカクサノボタン)	○	○	In the glades, especially around the National Road (RN2)
Poaceae (イネ)	Hyparrhenia (Hyparrhenia)	rufa (ヒッパリガヤ)	○	○	Gramineous carpet between valleys and riparian formations
Poaceae (イネ)	Panicum (キビ)	maximum (ギネアキビ)	○	○	
Poaceae (イネ)	Aristida (マツバシバ)	rufescens (チガヤ)	○		
Poaceae (イネ)	Imperata (チガヤ)	cylindrica (Sporobolus africanus)	○		
Poaceae (イネ)	Sporobolus (ネズミノオ)	africanus (Sporobolus africanus)		○	In marshy areas
Dennstaedtiaceae (コバノイシカグマ)	Pteridium (ワラビ)	Pteridium sp. (Pteridium 属の一種)	○	○	
Typhaceae (ガマ)	Typha (ガマ)	angustifolia (ホソバガマ)	○	○	
Cyperaceae (カヤツリグサ)	Cyperus (カヤツリグサ)	papyrus (カミガヤツリ)		○	
Araceae (サトイモ)	Typhonodorum (Typhonodorum)	lindleyanum (マダガスカルクワズイモ)	○	○	
Poaceae (イネ)	Phragmites (ヨシ)	mauritianus (Phragmites mauritianus)	○		Along the Mangoro river

M：「マ」橋周辺地域　　A：「ア」橋周辺地域

表 3-14　確認種一覧（鳥類）

FAMILY	GENUS	SPECIES	NOTES
Plocieidae (ハタオリドリ)	Foudia (ベニノジコ)	madagascariensis (ベニノジコ)	Inventory of avifauna species using the Mc Kinon list in both sites （現地調査）
Pycnonotidae (ヒヨドリ)	Hypsipetes (クロヒヨドリ)	madagascariensis (クロヒヨドリ)	
Nectariniidae (タイヨウチョウ)	Nectarinia	souimanga	
Sturnidae (ムクドリ)	Acridotheres (ハッカチョウ)	tristis 注 (インドハッカ)	
Falconidae (ハヤブサ)	Falco (ハヤブサ)	newtoni (マダガスカルチョウゲンボウ)	
Psittaculidae (インコ亜科)	Agapornis (ボタンインコ)	cana (カルカヤインコ)	
Corvidae (カラス)	Corvus (カラス)	albus (ムナジロガラス)	
Meropidae (ハチクイ)	Merops (ハチクイ)	superciliosus (マダガスカルハチクイ)	
Alaudidae (ヒバリ)	Mirafra (ヤブヒバリ)	hova	
Acrocephalidae (ヨシキリ)	Nesillas (シマヨシキリ)	typical (マダガスカルシマヨシキリ)	
Tytonidae (メンフクロウ)	Tyto (メンフクロウ)	soumagnei (マダガスカルメンフクロウ)	Bibliographic Studies （文献調査）
Cisticolidae (セッカ)	Neomixis (ムシクイチメドリ)	viridis (ミドリニセムシクイチメドリ)	
Mesitornithidae (クイナモドキ)	Mesitornis (チャイロクイナモドキ属)	unicolor (クリイロクイナモドキ)	

注）移入種

M：「マ」橋周辺地域　　A：「ア」橋周辺地域

表 3-15　確認種一覧（哺乳類）

FAMILY	GENUS	SPECIES	NOTES
Cheirogaleidae (コビトキツネザル)	Cheirogaleus (コビトキツネザル)	major (オオコビトキツネザル)	Bibliographic studies. （文献調査） Source: *Diversity and ecology of small mammals in forest and anthropogenic habitats of Moramanga District. Toky M. Randriamoria*
Indriidae (インドリ)	Avahi (アバヒ)	Laniger (ウーリーキツネザル)	
Daubentonidae (アイアイ)	Daubentonia (アイアイ)	Madagascariensis (アイアイ)	
Eupleridae (マダガスカルマングース)	Galidia (ワオマングース)	elegans (ワオマングース)	
Eupleridae (マダガスカルマングース)	Cryptoprocta (フォッサ)	ferox (フォッサ)	
Soricidae (トガリネズミ)	Suncus (ジャコウネズミ)	Etruscus (コビトジャコウネズミ)	
Soricidae (トガリネズミ)	Suncus (ジャコウネズミ)	murinus (コビトジャコウネズミ)	
Tenrecidae (テンレック)	Tenrec (テンレック)	ecaudatus (テンレック)	
Tenrecidae (テンレック)	Microgale (オナガテンレック)	cowani (カウアンテンレック)	
Tenrecidae (テンレック)	Microgale (オナガテンレック)	majori	
Tenrecidae (テンレック)	Microgale (オナガテンレック)	pusilla (チビオナガテンレック)	
Tenrecidae (テンレック)	Microgale (オナガテンレック)	thomasi (トマスオナガテンレック)	
Muridae (ネズミ)	Rattus (クマネズミ)	rattus 注 (クマネズミ)	
Muridae (ネズミ)	Rattus (クマネズミ)	norvegicus 注 (ドブネズミ)	
Muridae (ネズミ)	Mus (ハツカネズミ)	musculus 注 (ハツカネズミ)	

注）移入種

表 3-16　確認種一覧（爬虫類）

FAMILY	GENUS	SPECIES	NOTES
Boidae (ボア)	Boa (ボア)	mandotra	Bibliographic studies. Source: Regional Environmental Scoreboard Alaotra-Mangoro. ONE （文献調査）
Chamaeleonidae (カメレオン)	Calumma (Calumma)	parsonii (パーソンカメレオン)	

表 3-17　確認種一覧（水域生息動物）

FAMILY	GENUS	SPECIES	NOTES
Anguillidae (ウナギ)	Anguilla (ウナギ)	mossambica (ウナギ)	Inventory of catches in the Mangoro River - personal survey （現地調査）
Crocodylidae (クロコダイル)	Crocodilus (クロコダイル)	nilotica (ナイルワニ)	
Parastacidae (ミナミザリガニ)	Astacoides (Astacoides)	madagascariensis (マダガスカル淡水ザリガニ)	
Penaeidae (クルマエビ)	Litopenaeus (見当たらない)	Stylirostris (見当たらない)	
Cyprinidae (コイ)	Carassius (フナ)	auratus (金魚)	Inventory through fishermen's catches in the Mangoro River （現地調査）
Cyprinidae (コイ)	Cyprinus (コイ)	carpio (コイ)	
Cichlidae (カワスズメ)	Tilapia (ティラピア)	nilotica (チカダイ)	
Cichlidae (カワスズメ)	Tilapia (ティラピア)	sp (ティラピアの一種)	
Cichlidae (カワスズメ)	Paratilapia (パラティラピア?)	sp (パラティラピアの一種?)	

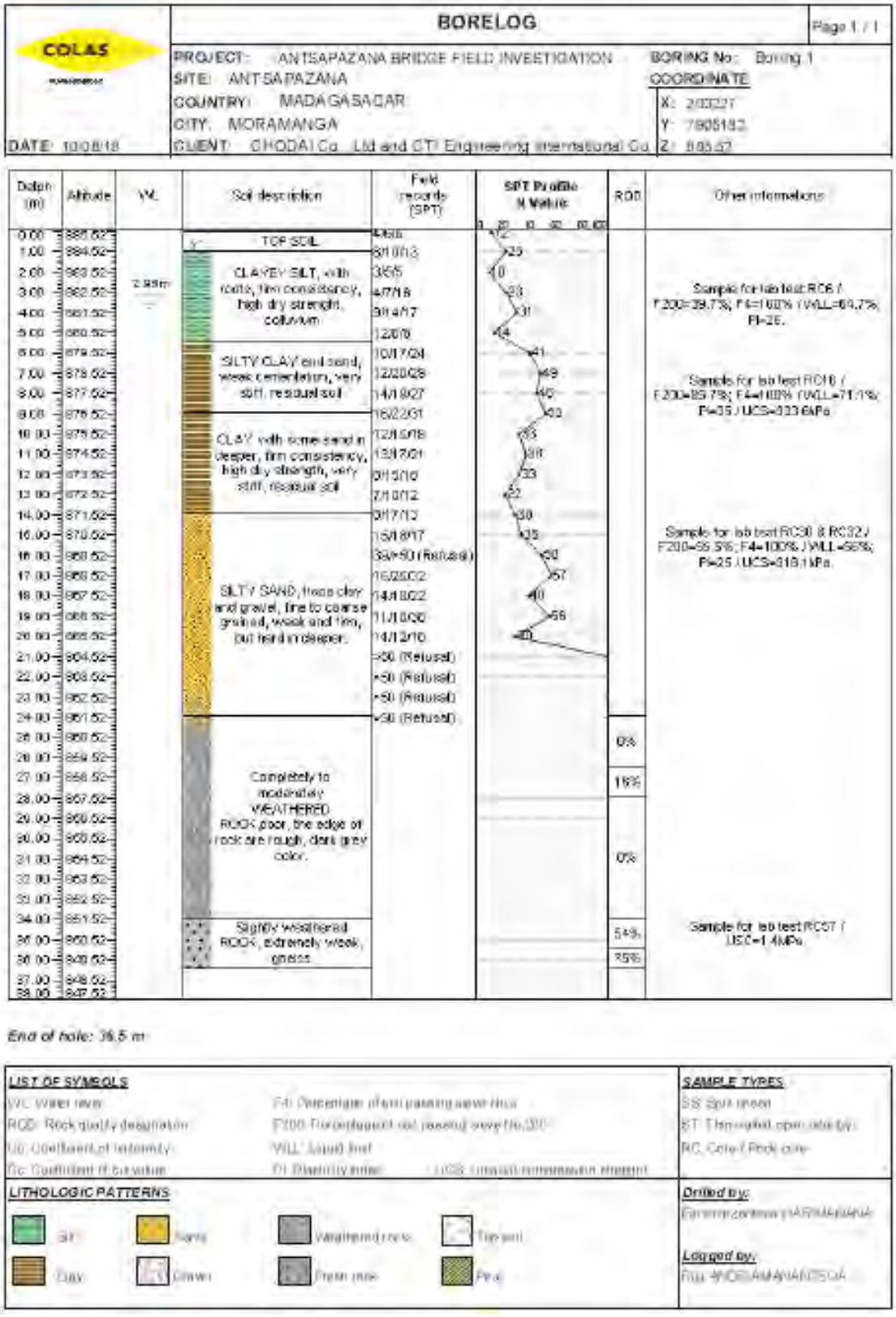
3.4.　大気質調査

大気質調査においては、スクリーニング時に事業による影響を与える項目として挙げられていなかったことから、現地測定及び分析は行っていない。

事業予定地周辺では、交通量が少なく渋滞は発生しないこと、工場等の産業活動がないこと、山火事の発生も散発的かつ季節的であること、また、当該地域周辺は特に高い植生被覆を持つ農村地域であることから、大気の質は良いと考えられている。
当該地域と同様、農村で産業活動からの排気がほとんどない環境が広がる、マダガスカル南部に位置する農村地域（Fort-Dauphin）で行われた大気質の調査の結果、様々な汚染物質（CO、CO2、NO2、SO2、VOC、PAH）の濃度が低いことを示している。調査により得られた数値は、WHOの国際基準地の 20～39%未満の値であった(SENES Consultants, 2001a)。

5.2. ボーリング柱状図

（1）アンツァパザナ橋



BORELOG

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COLAS

PROJECT: ANTSAPAZANA BRIDGE FIELD INVESTIGATION
SITE: ANTSAPAZANA
COUNTRY: MADAGASACAR
CITY: MORAMANGA
CLIENT: CHODAI Co., Ltd and CTI Engineering international Co.

BORING No: Boring 1
COORDINATE
X: 200227
Y: 7905182
Z: 883.52

DATE: 10/08/18

Depth (m)	Altitude	WL	Soil description	Field records (SPT)	SPT Profile N Value	RQD	Other informations
0.00	885.52		TOP SOIL	4/6/6			
1.00	884.52			8/10/13	23		
2.00	883.52	2.85m	CLAYEY SILT, with roots, firm consistency, high dry strenght, colluvium	3/5/5	10		
3.00	882.52			4/7/16	23		Sample for lab test RC6 / F200=39.7%; F4=100% / WLL=69.7%; PI=26.
4.00	881.52			9/14/17	31		
5.00	880.52			12/20	14		
6.00	879.52		SILTY CLAY and sand, weak cementation, very stiff, residual soil	10/17/24	41		
7.00	878.52			12/20/29	49		Sample for lab test RC16 / F200=89.7%; F4=100% / WLL=71.1%; PI=35 / UCS=833.6kPa
8.00	877.52			14/18/27	45		
9.00	876.52			16/22/31	53		
10.00	875.52		CLAY with some sand in deeper, firm consistency, high dry strength, very stiff, residual soil	12/15/18	33		
11.00	874.52			13/17/21	38		
12.00	873.52			9/15/18	33		
13.00	872.52			7/10/12	22		
14.00	871.52			9/17/13	30		
15.00	870.52			15/18/17	35		Sample for lab test RC30 & RC32 / F200=56.5%; F4=100% / WLL=56%; PI=25 / UCS=818.1kPa.
16.00	869.52			34/>50 (Refusal)	50		
17.00	868.52			16/25/32	57		
18.00	867.52		SILTY SAND, trace clay and gravel, fine to coarse grained, weak and firm, but hard in deeper.	14/18/22	40		
19.00	866.52			11/18/20	38		
20.00	865.52			14/12/10	22		
21.00	864.52			>50 (Refusal)			
22.00	863.52			>50 (Refusal)			
23.00	862.52			>50 (Refusal)			
24.00	861.52			>50 (Refusal)			
25.00	860.52					0%	
26.00	859.52						
27.00	858.52		Completely to moderately WEATHERED ROCK poor, the edge of rock are rough, dark grey color.			16%	
28.00	857.52						
29.00	856.52						
30.00	855.52					0%	
31.00	854.52						
32.00	853.52						
33.00	852.52						
34.00	851.52						
35.00	850.52		Slightly weathered ROCK, extremely weak, grass			54%	Sample for lab test RC37 / UCS=1.4MPa.
36.00	849.52					75%	
37.00	848.52						
38.00	847.52						

End of hole: 36.5 m

LIST OF SYMBOLS

WL: Water level
RQD: Rock quality designation
Ud: Coefficient of heterogeneity
Cc: Coefficient of curvature
F4: Percentage of soil passing sieve No.4
F200: Fine (percentage of soil passing sieve No.200)
WLL: Liquid limit
PI: Plasticity index
UCS: Unixial compression strength

SAMPLE TYPES

SS: Split spoon
ST: Thin-walled open tube (U)
RC: Core / Rock core

LITHOLOGIC PATTERNS

Silt / Sand / Weathered rock / Top soil
Clay / Gravel / Fresh rock / Fill

Drilled by:

Logged by:

PICTURE

PROJECT	ANTSAPAZANA BRIDGE
BOREHOLE LOCATION	BOREHOLE No01
BOXE No	01
FROM	0,00 M
TO	3,00 M

PROJECT	ANTSAPAZANA BRIDGE
BOREHOLE LOCATION	BOREHOLE No01
BOXE No	02
FROM	3,00 M
TO	7,00 M

PROJECT	ANTSAPAZANA BRIDGE
BOREHOLE LOCATION	BOREHOLE No01
BOXE No	03
FROM	7,00 M
TO	11,00 M

PROJECT	ANTSAPAZANA BRIDGE
BOREHOLE LOCATION	BOREHOLE No01
BOXE No	04
FROM	11,00 M
TO	15,00 M

PROJECT	ANTSAPAZANA BRIDGE
BOREHOLE LOCATION	BOREHOLE No01
BOXE No	05
FROM	15,00 M
TO	19,00 M

PROJECT	ANTSAPAZANA BRIDGE
BOREHOLE LOCATION	BOREHOLE No01
BOXE No	06
FROM	19,00 M
TO	23,00 M

PROJECT	ANTSAPAZANA BRIDGE
BOREHOLE LOCATION	BOREHOLE No01
BOXE No	07
FROM	23,00 M
TO	28,00 M

PROJECT	ANTSAPAZANA BRIDGE
BOREHOLE LOCATION	BOREHOLE No01
BOXE No	08
FROM	
TO	

BORELOG

Page 1 / 1

COLAS

DATE: 03/08/18

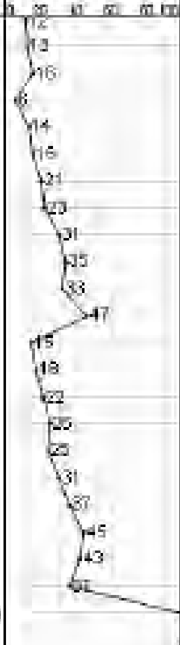
PROJECT: ANTSAPAZANA BRIDGE FIELD INVESTIGATION
SITE: ANTSAPAZANA
COUNTRY: MADAGASACAR
CITY: MORAMANGA
CLIENT: CHODAI Co., Ltd and CTI Engineering International Co.

BORING No: Boring 2
COORDINATE
X: 703282.1
Y: 7906488
Z: 385.329

Depth (m)	Altitude	WL	Field records (SPT)
0.00	385.33		4/5/7
1.00	384.33		3/5/8
2.00	383.33	2.58m	3/6/10
3.00	382.33		5/3/3
4.00	381.33		4/7/7
5.00	380.33		3/7/9
6.00	379.33		4/7/14
7.00	378.33		5/10/13
8.00	377.33		8/13/18
9.00	376.33		10/15/20
10.00	375.33		9/14/19
11.00	374.33		18/22/25
12.00	373.33		17/8/7
13.00	372.33		5/8/10
14.00	371.33		7/8/13
15.00	370.33		5/10/16
16.00	369.33		9/11/14
17.00	368.33		8/13/18
18.00	367.33		13/16/21
19.00	366.33		15/20/25
20.00	365.33		10/19/24
21.00	364.33		9/15/22
22.00	363.33		32/>50 (Refusal)
23.00	362.33		>50 (Refusal)
24.00	361.33		>50 (Refusal)
25.00	360.33		
26.00	359.33		
27.00	358.33		
28.00	357.33		
29.00	356.33		
30.00	355.33		
31.00	354.33		
32.00	353.33		
33.00	352.33		
34.00	351.33		
35.00	350.33		
36.00	349.33		
37.00	348.33		
38.00	347.33		

Soil description	RQD	Other informations
CLAYEY SILT, silt with few sand, brownish color, firm consistency, colluvium		Sample for lab test:SS05 / F200=74%, F4=100% / WLL=57.2%; PI=39.
CLAY with some sand in deeper, very stiff, high dry strength, colluvium		Sample for lab test:SS13 & RC14 / F200=84%, F4=100% / WLL=64.3%, PI=33 / UCS=271 KPa
CLAYEY SILT, with some sand, soft to firm consistency, medium dry strength, white and pinkish color		Sample for lab test:SS21 & RC22 / F200= -%, F4= -% / WLL=71.2%; PI=39 / UCS=255.0kPa
SILTY SAND, trace clay and gravel, fine to coarse grained, weak, firm and hard in deeper		Sample for lab test:SS33 & RC32 / F200=35.6%; F4=100% / WLL=59.2%; PI=25.
SILTY CLAY and silty sand, weak, hard to very hard in deeper		Sample for lab test:SS41 & RC40 / F200=35.6%; F4=100% / WLL=53.2%; PI=25.
Completely to highly WEATHERED ROCK, recovery is very poor, very hard layer, gneiss	0%	
Highly to moderately WEATHERED ROCK, the edge of rock are rough, dark grey color, gneiss	18% 29% 0%	
FRESH ROCK, strong, gneiss	57% 79% 98%	Sample for lab test:RC69 / UCS=54.7MPa

SPT Profile N Value



End of hole: 38.25 m

LIST OF SYMBOLS

WL: Water level
RQD: Rock quality designation
Cu: Coefficient of uniformity
Cc: Coefficient of curvature
PI: Plasticity index
UCS: Uniaxial compression strength

SAMPLE TYPES

SS: Split spoon
RC: Core

LITHOLOGIC PATTERNS

Silt, Sand, Weathered rock, Top soil, Clay, Gravel, Fresh rock

Drilled by:

Logged by:

PICTURE

PROJECT	ANTSAPAZANA BRIDGE
BOREHOLE LOCATION	BOREHOLE No02
BOXE No	01
FROM	0,00 M
TO	3,00 M

PROJECT	ANTSAPAZANA BRIDGE
BOREHOLE LOCATION	BOREHOLE No02
BOXE No	02
FROM	3,00 M
TO	7,00 M

PROJECT	ANTSAPAZANA BRIDGE
BOREHOLE LOCATION	BOREHOLE No02
BOXE No	03
FROM	7,00 M
TO	10,00 M

PROJECT	ANTSAPAZANA BRIDGE
BOREHOLE LOCATION	BOREHOLE No02
BOXE No	04
FROM	10,00 M
TO	14,00 M

PROJECT	ANTSAPAZANA BRIDGE
BOREHOLE LOCATION	BOREHOLE No02
BOXE No	05
FROM	14,00 M
TO	18,00 M

PROJECT	ANTSAPAZANA BRIDGE
BOREHOLE LOCATION	BOREHOLE No02
BOXE No	06
FROM	18,00 M
TO	22,00 M

PROJECT	ANTSAPAZANA BRIDGE
BOREHOLE LOCATION	BOREHOLE No02
BOXE No	07
FROM	22,00 M
TO	31,00 M

PROJECT	ANTSAPAZANA BRIDGE
BOREHOLE LOCATION	BOREHOLE No02
BOXE No	08
FROM	31,00 M
TO	36,25 M

（2）マングル橋

COLAS

BOREL OG

Page 1 / 1

PROJECT: MANGORO BRIDGE FIELD INVESTIGATION
SITE: MANGORO
COUNTRY: MADAGASCAR
CITY: MORAMANGA
CLIENT: CHODAI Co., Ltd and CTI Engineering International Co.

BORING No.: Boring 1
COORDINATE
X: 195198.7
Y: 7919419
Z: 845.584

DATE: 13/09/19

Depth (m)	Altitude	WL	Soil description	Field records (SPT)	SPT Profile N Value	RQD	Other information
0.00	845.58		Silty sand, fine to coarse grained abundant roots, brown to orangey, TOP SOIL	3/5/5			
1.00	844.58			8/5/5	40		
2.00	843.58		SILTY SAND, some gravel, moist, brownish mottled yellow color, residual soil	>50 (Refusal)		37%	
3.00	842.58	Dry				69%	
4.00	841.58					36%	
5.00	840.58		Highly to moderately WEATHERED ROCK, the edge of rock are dark grey, gneiss			15%	
6.00	839.58					56%	
7.00	838.58						
8.00	837.58					33%	
9.00	836.58						
10.00	835.58						
11.00	834.58		FRESH ROCK, excellent, medium strong, granite (the top of massive rock are 11.50m).				
12.00	833.58					97%	Sample for lab test(RC13) UCS=45.0MPa.
13.00	832.58						
14.00	831.58					98%	
15.00	830.58					99%	
16.00	829.58						

End of hole: 15.1 m

LIST OF SYMBOLS

WL: Water level
RQD: Rock quality designation
Cu: Coefficient of uniformity
Cc: Coefficient of curvature
Fi: Percentage of soil passing sieve No.i
F200: Percentage of soil passing sieve No. 200
WL: Liquid limit
PI: Plasticity index
UCS: Unaxial compression strength

SAMPLE TYPES

SS: Split spoon
ST: Thin walled open (shelby)
RC: Core / Rock core

LITHOLOGIC PATTERNS

Fill
Gravel
Weathered rock
Top soil
Clay
Gravel
Fresh rock
Road

Drilled by:

Logged by:

PICTURE

PROJECT	MANGORO BRIDGE
BOREHOLE LOCATION	BOREHOLE No01
BOXE No	01
FROM	0,00 M
TO	3,00 M

PROJECT	MANGORO BRIDGE
BOREHOLE LOCATION	BOREHOLE No01
BOXE No	02
FROM	3,00 M
TO	8,50 M

PROJECT	MANGORO BRIDGE
BOREHOLE LOCATION	BOREHOLE No01
BOXE No	03
FROM	8,50 M
TO	14,50 M

PROJECT	MANGORO BRIDGE
BOREHOLE LOCATION	BOREHOLE No01
BOXE No	04
FROM	14,50 M
TO	15,10 M

PROJECT	MANGORO BRIDGE
BOREHOLE LOCATION	BOREHOLE No01
BOXE No	
FROM	
TO	

PROJECT	MANGORO BRIDGE
BOREHOLE LOCATION	BOREHOLE No01
BOXE No	
FROM	
TO	

COLAS	**BORELOG**	Page 1 / 1
DATE: 14/08/18	PROJECT: MANGORO BRIDGE FIELD INVESTIGATION SITE: MANGORO COUNTRY: MADAGASCAR CITY: MORAMANGA CLIENT: CHODAI Co., Ltd and CTI Engineering International Co.	BORING No: Boring 2 COORDINATE X: 196191.7 Y: 781031.2 Z: 847.057

Depth (m)	Altitude	WL	Soil description	Field records (SPT)	SPT Profile N Value (0 20 40 60 80 100)	RQD	Other informations
0.00	847.07		Silty sand, with gravel and cobble, TOP SOIL	5/6/13	19		
1.00	846.07		SILTY SAND, fine to coarse grained, moist, reddish brown color, residual soil	>50 (Refusal)			
2.00	845.07			8/8/9	17		
3.00	844.07		Highly to moderately WEATHERED ROCK, the edge of rock are rough, dark grey color, gneiss	5/18/>50			
4.00	843.07						
5.00	842.07	Dry				75%	
6.00	841.07					97%	
7.00	840.07		FRESH ROCK, excellent and strong, (granite)				
8.00	839.07					90%	
9.00	838.07					88%	Sample for lab test:RC1.2 / UCS=74.4MPa
10.00	837.07						
11.00	836.07						
12.00	835.07						
13.00	834.07						
14.00	833.07						
15.00	832.07						
16.00	831.07						

End of hole: 9.75 m

LIST OF SYMBOLS		**SAMPLE TYPES**
WL: Water level	F4: Percentage of soil passing sieve No4	SS: Split spoon
RQD: Rock quality designation	F200: Percentage of soil passing sieve No. 200	ST: Thin walled tube (shelby)
Cu: Coefficient of uniformity	WL: Liquid limit	RC: Core / Rock core
Cc: Coefficient of curvature	PI: Plasticity index — UCS: Uniaxial compressive strength	

LITHOLOGIC PATTERNS				**Drilled by:** [illegible]
Fill	Sand	Weathered rock	Top soil	
Clay	Gravel	Fresh rock	Silt	**Logged by:** [illegible]

PICTURE

PROJECT	MANGORO BRIDGE
BOREHOLE LOCATION	BOREHOLE No02
BOXE No	01
FROM	0,00 M
TO	3,00 M

PROJECT	MANGORO BRIDGE
BOREHOLE LOCATION	BOREHOLE No02
BOXE No	02
FROM	3,00 M
TO	7,10 M

PROJECT	MANGORO BRIDGE
BOREHOLE LOCATION	BOREHOLE No02
BOXE No	03
FROM	7,10 M
TO	9,75 M

PROJECT	MANGORO BRIDGE
BOREHOLE LOCATION	BOREHOLE No02
BOXE No	04
FROM	
TO	

BORELOG

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COLAS

DATE: 29/08/18	PROJECT: MANGORO BRIDGE FIELD INVESTIGATION	BORING No: Boring 3
	SITE: MANGORO	COORDINATE
	COUNTRY: MADAGASCAR	X: 185196.4
	CITY: MORAMANGA	Y: 7810369
	CLIENT: CHODAI Co., Ltd and CTI Engineering International Co.	Z: 839.422

Depth (m)	Altitude	WL	Soil description	Field records (SPT)	SPT Profile N Value	RQD	Other informations
0.00	839.42		FRESH ROCK, excellent quality, granite (top of the massive rock is at 1.63m)			97%	
1.00	838.42					0%	
2.00	837.42					28%	
3.00	836.42					97%	
4.00	835.42					99%	
5.00	834.42					97%	
6.00	833.42					99%	
7.00	832.42						
8.00	831.42						
9.00	830.42						
10.00	829.42						
11.00	828.42						
12.00	827.42						
13.00	826.42						
14.00	825.42						
15.00	824.42						
16.00	823.42						

SPT Profile N Value scale: 0 20 40 60 80 100

End of hole: 8.5 m

LIST OF SYMBOLS

WL: Water level
RQD: Rock quality designation
Cu: Coefficient of uniformity
Cc: Coefficient of curvature
(%)4: Percentage of soil passing sieve No 4
(%)200: Percentage of soil passing sieve No 200
WLL: Liquid limit
PI: Plasticity index
UCS: Uniaxial compression strength

SAMPLE TYPES

SS: Split spoon
ST: Thinwalled tube (shelby)
RC: Core / Rock core

LITHOLOGIC PATTERNS

Silt, Sand, Weathered rock, Top soil, Clay, Gravel, Fresh rock, Peat

Drilled by: [illegible]

Logged by: [illegible]

PICTURE

PROJECT	MANGORO BRIDGE
BOREHOLE LOCATION	BOREHOLE No03
BOXE No	01
FROM	0,00 M
TO	5,50 M

PROJECT	MANGORO BRIDGE
BOREHOLE LOCATION	BOREHOLE No03
BOXE No	02
FROM	5,50 M
TO	6,50 M

BORELOG

COLAS

PROJECT: MANGORO BRIDGE FIELD INVESTIGATION	BORING No.: Boring 4
SITE: MANGORO	COORDINATE
COUNTRY: MADAGASCAR	X: 195190.9
CITY: MORAMANGA	Y: 7910358
DATE: 14/08/15 — CLIENT: CHODAI Co., Ltd and CTI Engineering International Co.	Z: 835.96

Depth (m)	Altitude	WL	Soil description	Field records (SPT)	SPT Profile N Value (0 20 40 60 80 100)	RQD	Other informations
0.00	835.96		FRESH ROCK, excellent quality, granite (top of massive rock is at 1.35m)			0%	
1.00	834.96						
2.00	833.96					38%	
3.00	832.96					98%	
4.00	831.96					100 %	
5.00	830.96					98%	
6.00	829.96						
7.00	828.96						
8.00	827.96						
9.00	826.96						
10.00	825.96						
11.00	824.96						
12.00	823.96						
13.00	822.96						
14.00	821.96						
15.00	820.96						
16.00	819.96						

End of hole: 6 m

LIST OF SYMBOLS

WL: Water level
RQD: Rock quality designation
Cu: Coefficient of uniformity
Cc: Coefficient of curvature
[illegible]
[illegible]
WL: Liquid limit
PI: Plasticity index
UCS: Uniaxial compression strength

SAMPLE TYPES

SS: Split spoon
ST: Thin-walled open (Shelby)
RC: Core / Rock core

LITHOLOGIC PATTERNS

Soil · Sand · Weathered rock · Top soil · Clay · Gravel · Fresh rock · Peat

Drilled by:
[illegible]

Logged by:
[illegible]

PICTURE

PROJECT	MANGORO BRIDGE
BOREHOLE LOCATION	BOREHOLE No04
BOXE No	01
FROM	0,00 M
TO	4,75 M

PROJECT	MANGORO BRIDGE
BOREHOLE LOCATION	BOREHOLE No04
BOXE No	02
FROM	4,75 M
TO	6,00 M

BORELOG

COLAS

DATE: 21/03/18

PROJECT: MANGORO BRIDGE FIELD INVESTIGATION
SITE: MANGORO
COUNTRY: MADAGASCAR
CITY: MORAMANGA
CLIENT: CHODAI Co., Ltd and CTI Engineering International Co.

BORING No: Boring 5
COORDINATE
X: 195189.4
Y: 910008
Z: 838.994

Depth (m)	Altitude	W.L	Soil description	Field records (SPT)	SPT Profile N Value	RQD	Other informations
0.00	838.99					81%	
1.00	837.99					92%	
2.00	836.99					95%	
3.00	835.99		FRESH ROCK, excellent quality, granite (top of massive rock is at 1.00m)			92%	
4.00	834.99					95%	
5.00	833.99						
6.00	832.99					98%	
7.00	831.99						
8.00	830.99						
9.00	829.99						
10.00	828.99						
11.00	827.99						
12.00	826.99						
13.00	825.99						
14.00	824.99						
15.00	823.99						
16.00	822.99						

End of hole: 6.85 m

LIST OF SYMBOLS
WL: Water level
RQD: Rock quality designation
Cu: Coefficient of uniformity
Cc: Coefficient of curvature
F4: Percentage of soil passing sieve No4
F200: Percentage of soil passing sieve No 200
WL: Liquid limit
PI: Plasticity index
UCS: Unconfined compression strength

SAMPLE TYPES
SS: Split spoon
ST: Thin walled tube (Shelby)
RC: Core / Rock core

LITHOLOGIC PATTERNS
Silt, Sand, Weathered rock, Top soil, Clay, Gravel, Fresh rock, Peat

Drilled by:
[illegible]

Logged by:
[illegible]

PICTURE

PROJECT	MANG ORO BRIDGE
BOREHOLE LOCATION	BOREHOLE No05
BOXE No	01
FROM	0,00 M
TO	3,50 M

PROJECT	MANGORO BRIDGE
BOREHOLE LOCATION	BOREHOLE No05
BOXE No	02
FROM	3,50 M
TO	6,65 M

6.　その他の資料・情報

6.1.　説明資料

マダガスカル国

アンタナナリボ・トアマシナ間
経済都市軸橋梁整備計画

説明資料

2019年2月

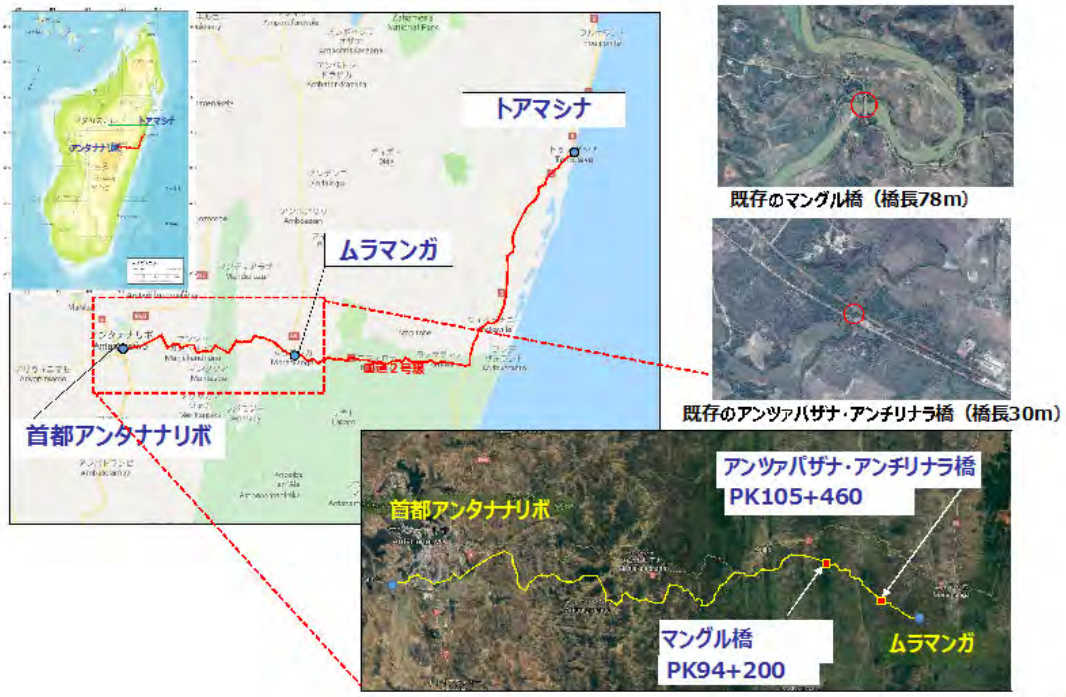
株式会社　　長　　大
株式会社　　建設技研ｲﾝﾀｰﾅｼｮﾅﾙ

1

目　　次

2

1. 位置図

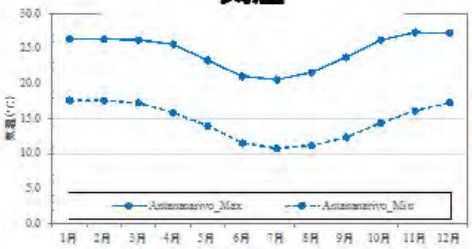


2. プロジェクト目標

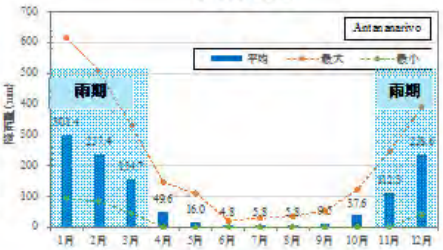
現在の課題	（1）物流のボトルネックの解消 • 既存のマングル橋とアンツァパザナ橋は、国道2号線上唯一の単線区間のため、**将来交通量に対応できない** • **既存橋は、老朽化が進行**している。 （2）安全性の向上 • 既存橋には**歩道が設置されておらず、危険**な状態である
プロジェクト目標	• 対象区間の橋梁、取付道路の整備を行うことにより、同区間における輸送能力の改善をはかり、国内及び周辺国の物流の活性化に寄与する
成果	• **マングル橋の建設**（既存橋の上流側に建設する）、及び**アンツァパザナ橋の建設**（既存橋と同位置に架け替え） • 上記橋梁の取付道路の建設 • 本事業の対象区間の2車線化

3. サイト状況

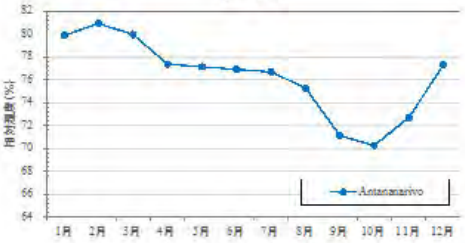
気温



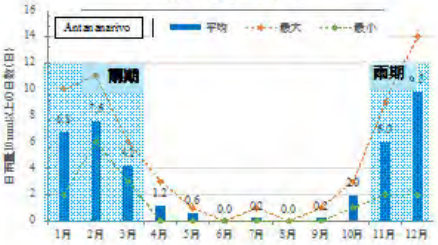
降水量



湿度



降雨日数



5

河川状況

(1)河川概要：

- マングル川：延長約300km、流域面積約18,000km²の大河。マングル橋上流の流域面積は約3,600km²
- アンツァパザナ川は、マングル川の支流。流域面積約500km²の大河。ｱﾝﾂｧﾊﾟｻﾞﾅ橋上流の流域面積は約100m²

(2) 主な河川諸元：

（縦横位置近傍の数値を示す）

項目	ﾏﾝｸﾞﾙ橋	ｱﾝﾂｧﾊﾟｻﾞﾅ橋
川　幅	約95m	約25m
河床勾配	1/1,100	1/450
計画対象流量	2,750 m³/s	100 m³/s
流速（雨期最大）	5.87 m/s	2.10 m/s
雨期最大水深	9.0 m程度	2.5 m程度
乾期最大水深	4.0 m程度	1.0 m程度

(3) 流況：

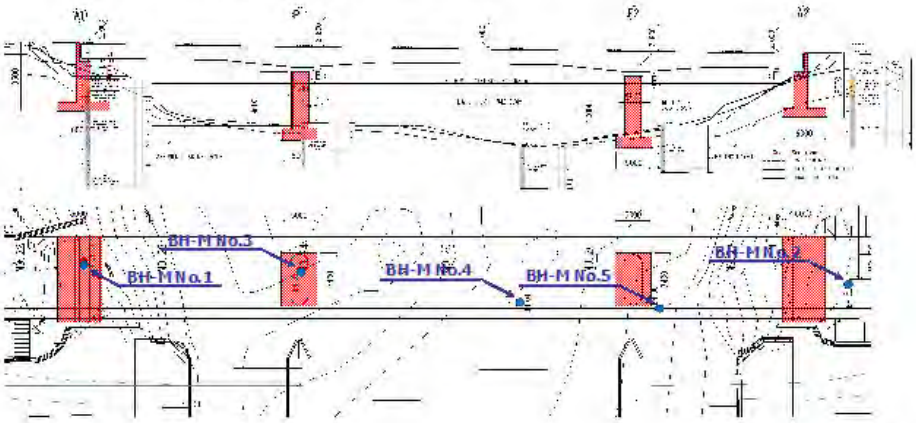
（2018年7月（乾期）に撮影）

6

地質状況（マングル橋）

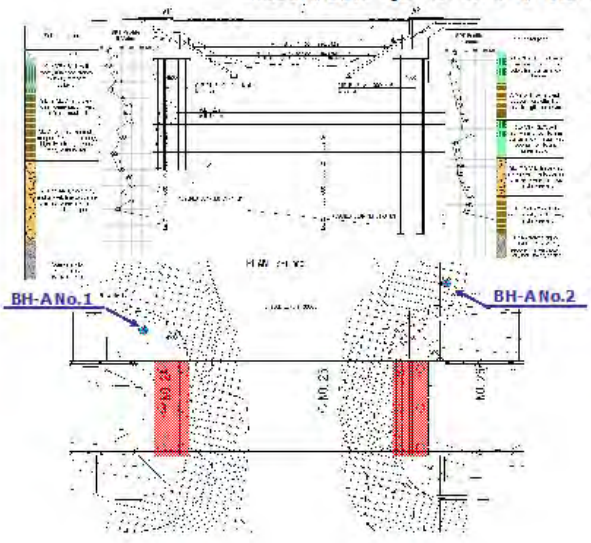
特徴：

- 橋台位置：表層から３～４mまでは残積土（N<20)、これ以深に、風化岩（花崗岩）が分布
- 河川内：新鮮な岩が河床に分布



7

地質状況（アンツァパザナ）



特徴：

- 表層から中間層は、シルト～粘土、砂質土が堆積
- N値はバラつきがある。
- 基盤岩は、地表から25m程度の深さに分布
- 支持層
  - A1：砂質土
  - A2：粘土～砂質土

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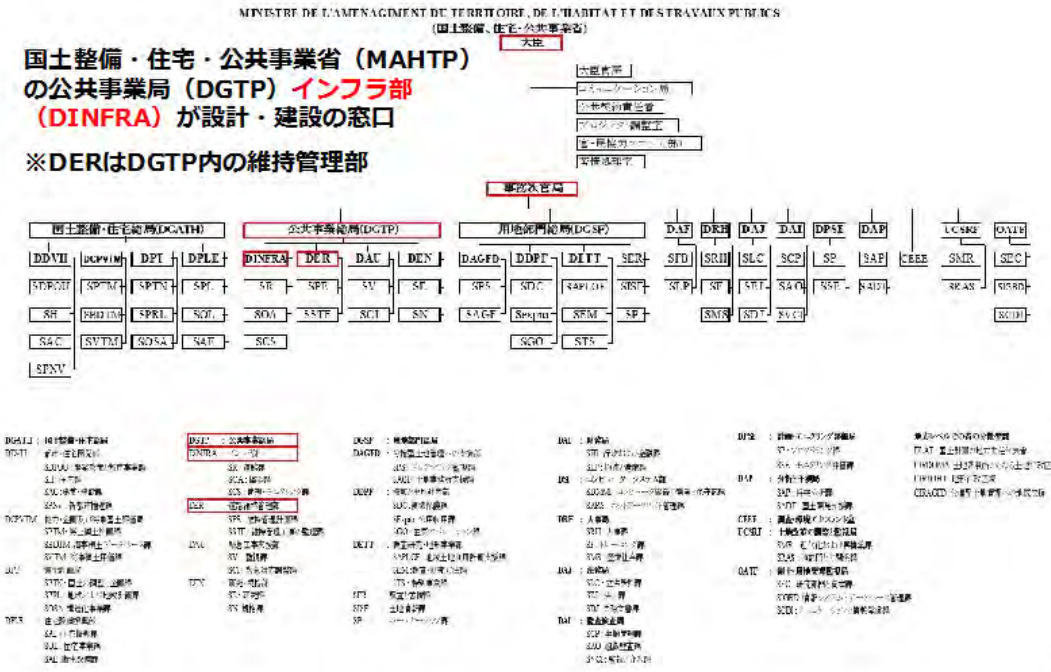
4. 実施体制

国土整備・住宅・公共事業省（MAHTP）
の公共事業局（DGTP）インフラ部
（DINFRA）が設計・建設の窓口

※DERはDGTP内の維持管理部



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5. 対象橋梁

マングル橋の概要

項目	既存橋	新　橋
架橋位置	RN2: PK-94+200	**既存橋の上流側**
利用形態	歩行者兼用道鉄併用橋	**歩車道橋**
橋種	3径間鋼トラス橋	**3径間連続PC箱桁橋**
橋長	78.0m	**102.0m**
車道幅員	4.0m	**3.5+3.5=7.0m**
歩道幅員	なし	**両側歩道 各1.5m**

※既存橋は、鉄道橋として残置する。
※一般交通は、新橋建設中に既存橋を利用する。

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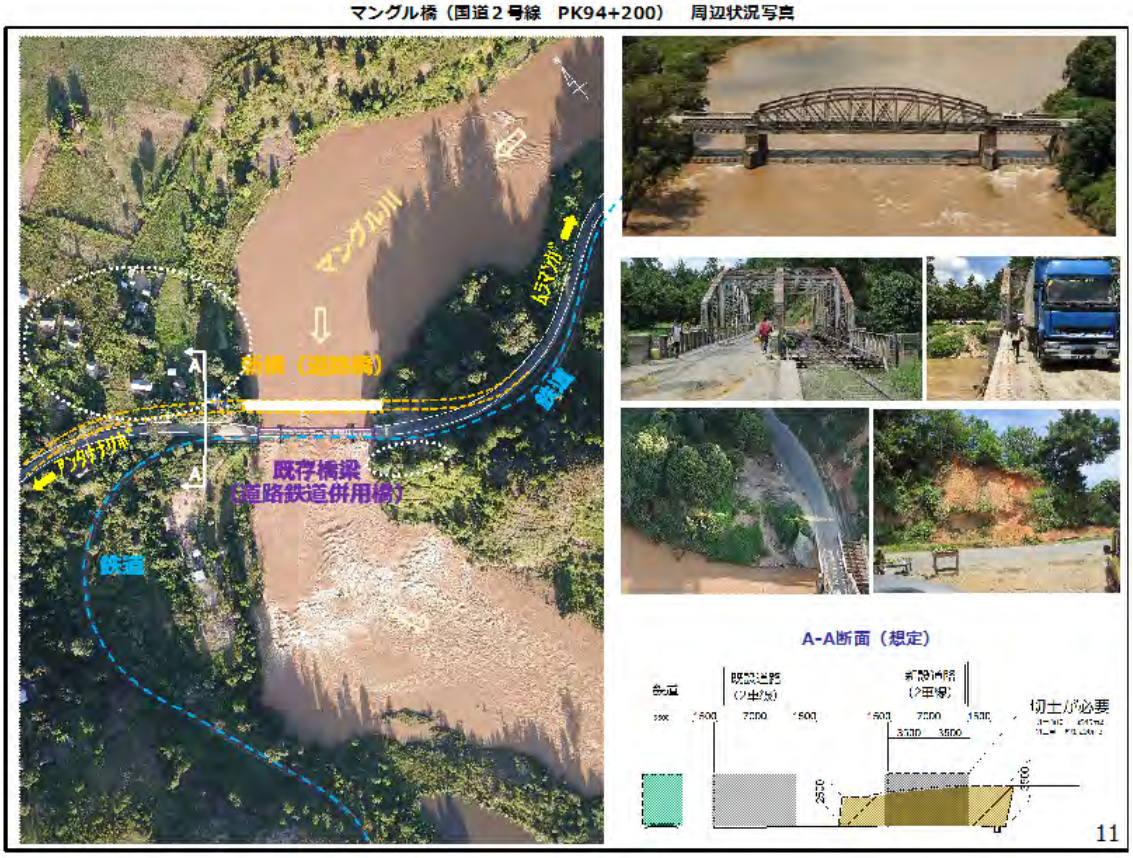
マングル橋（国道２号線　PK94+200）　周辺状況写真



5. 対象橋梁

アンツァパザナ橋の概要

項目	既存橋	新　橋
架橋位置	RN2: PK-105+460	**既存橋と同位置**
利用形態	歩車道橋	**歩車道橋**
橋種	単純鋼トラス橋	**単純PC中空床版橋**
橋長	30.0m	**30.0m**
車道幅員	4.5m	**3.5+3.5=7.0m**
歩道幅員	なし	**両側歩道 各1.5m**

※既存橋は、MAHTPが再利用する。本邦請負業者は既存橋を撤去し、MAHTPムラマンガ事務所に輸送する。

※一般交通は、本邦請負業者が建設する迂回路を利用する。

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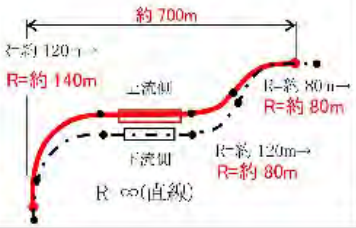
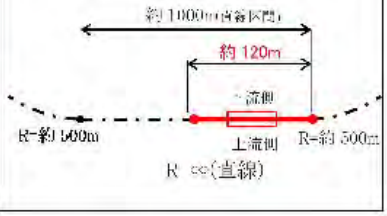
アンツァバザナ・アンチリナラ橋（国道２号線　PK105+460）　周辺状況写真

6. 道路計画

架橋位置・改良区間

項　目	マンダル	アンツァバザナ
現　況	40km/hr	80km/hr
設計速度	50km/hr	80km/hr
改良区間	約 700m	約 120m
概要図		

既存の道路

本事業で建設する道路

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幅員構成

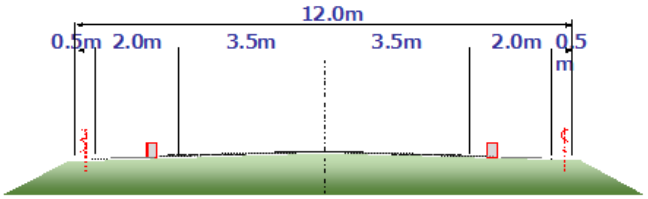
交通量

現況： 1,700台/日 （2018年、マングル橋）

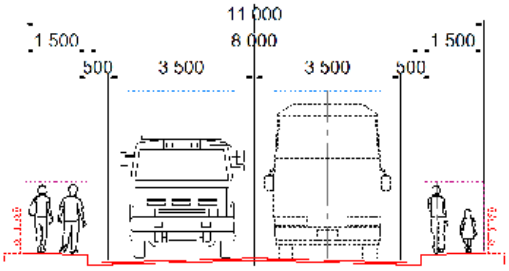
2,000台/日 （2018年、アンツァパザナ橋）

計画： 6,240台/日 （2033年）

土工部



橋梁部



- 本図は、標準的な幅員構成を示す。

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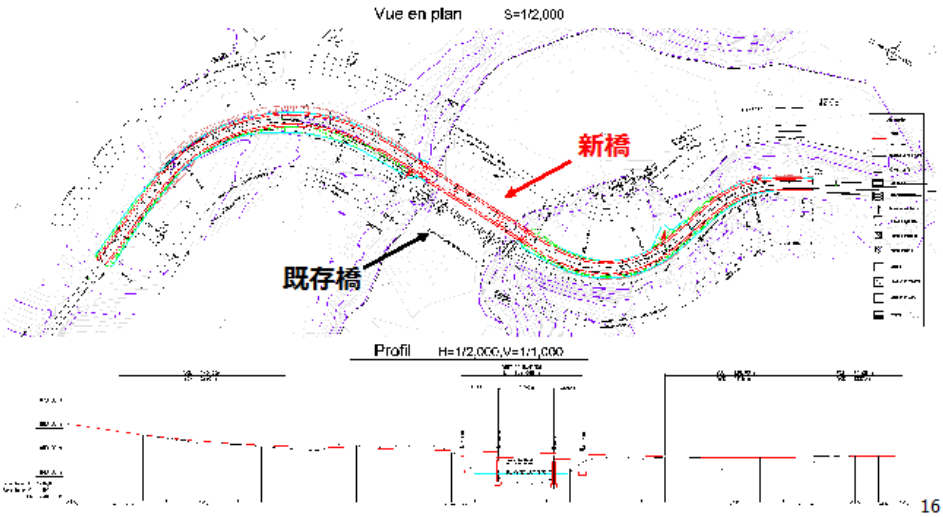
道路線形計画

マングル橋



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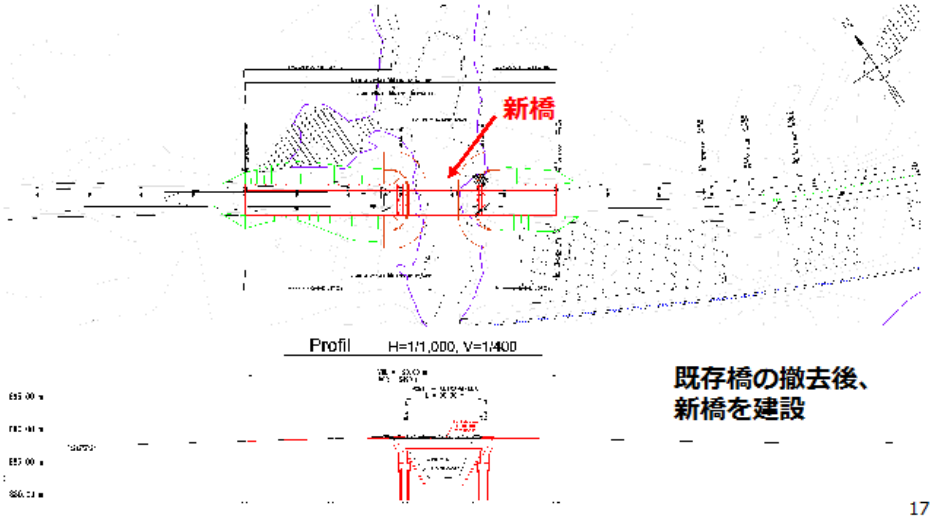
道路線形計画

アンツァパザナ橋



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7. 橋梁計画

構造形式一覧

項目	マングル橋	アンツァパザナ橋
橋長	102.0m	30.0m
支間割	31.0m+47.0m+24.0m	30m
上部工形式	3径間連続PC箱桁橋	単純PC中空床版橋
橋台形式	逆T式橋台	逆T式橋台
橋脚形式	壁式橋脚	なし
基礎形式	直接基礎	場所打ち杭基礎 (杭長14.5~22.5m)
護岸工	なし	練石護岸

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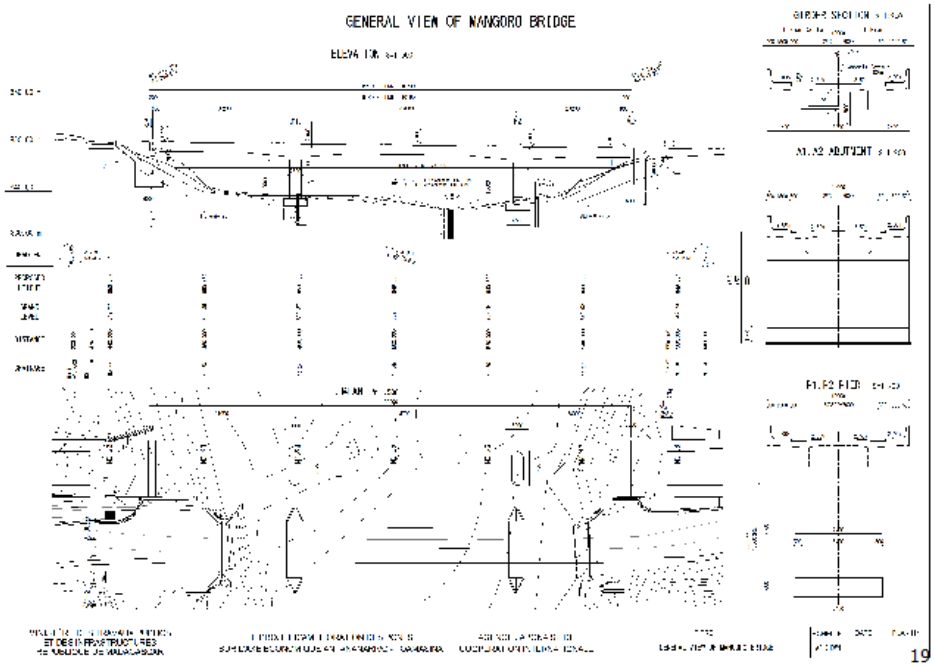
マングル橋



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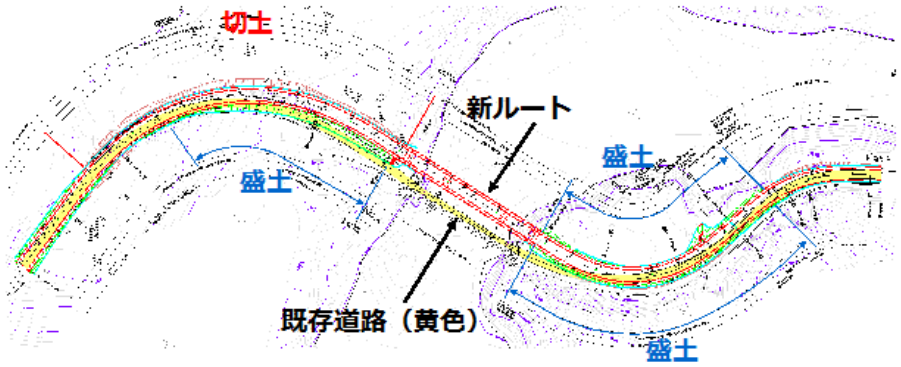
マングル橋の施工

- **新ルートの用地開拓**
  - ✓ 切土：
  - ✓ 盛土：
- **既存交通の確保**
  - ✓ 片側交互通行
  - ✓ 交通誘導員と安全施設の設置など



※ 本図は、切土と盛土の概略位置を示す。

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マングル橋の施工

- **下部工の施工**

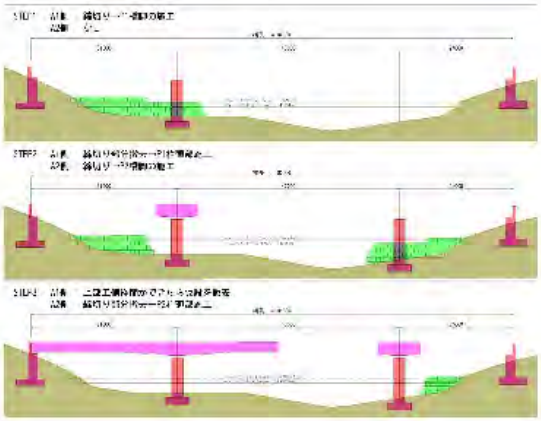
✓ 橋脚工
壁式橋脚　2基
構造高　10m程度
直接基礎（支持層は岩）

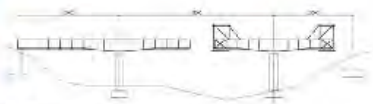
✓ 橋台工
逆T式橋台　2基
構造高　9m程度
直接基礎（支持層は岩）

- **上部工の施工**

✓ 3径間連続PC箱桁橋
L=102m
（31m＋47m＋24m）
桁高　柱頭部　h=3.0m
支間中央 h=2.0m

✓ 張り出し架設（移動作業車）





張り出し架設のイメージ

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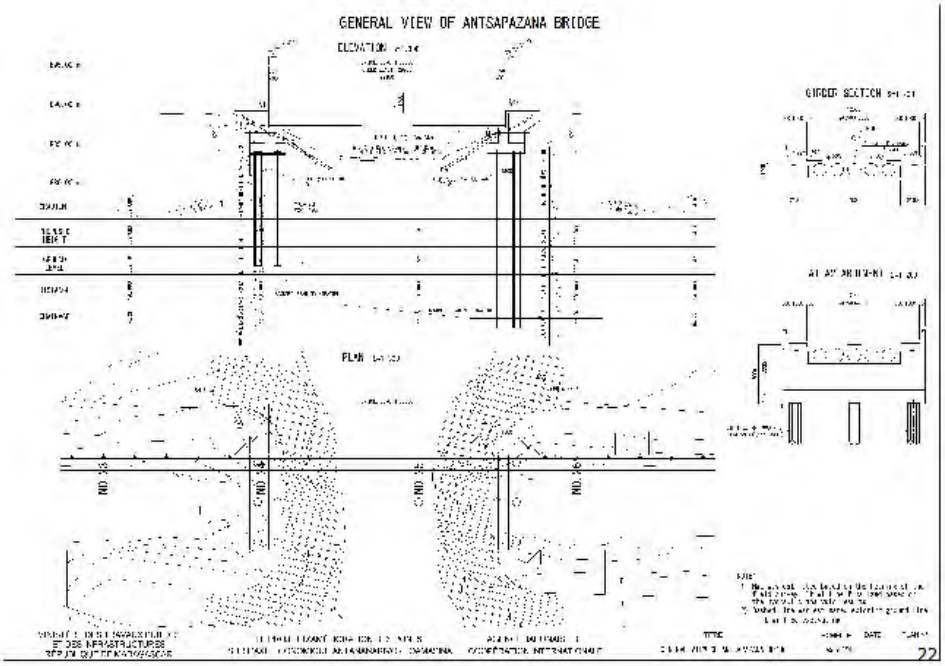
アンツァパザナ橋



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アンツァパザナ橋の施工

任意仮設による施工を想定

- **現道の切り回し**

✓ 迂回道路：

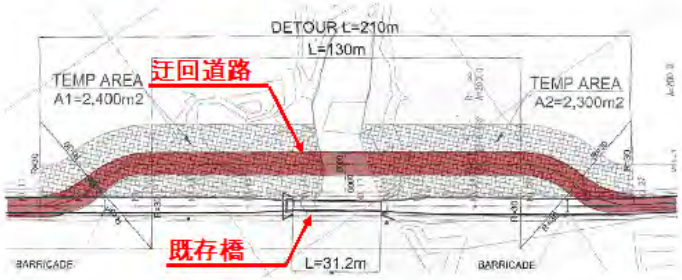
W＝3.50x2車線

延長約210m

盛土構造（h=2.5m程度）

砕石舗装

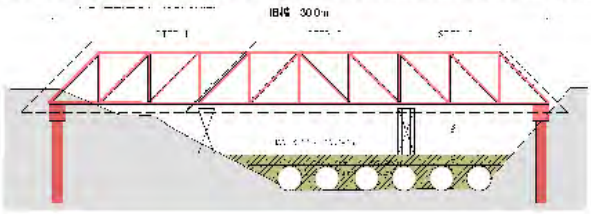
交通誘導員と安全施設の設置



- **既存橋の撤去・運搬**

✓ 再利用を前提に解体・撤去

✓ MAHTPムラマンガ事務所敷地内の指定場所に運搬



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アンツァパザナ橋の施工

MAHTPムラマンガ支局の位置図

✓ アンツァパザナ橋からMAHTPムラマンガ支局までの距離は、約10km

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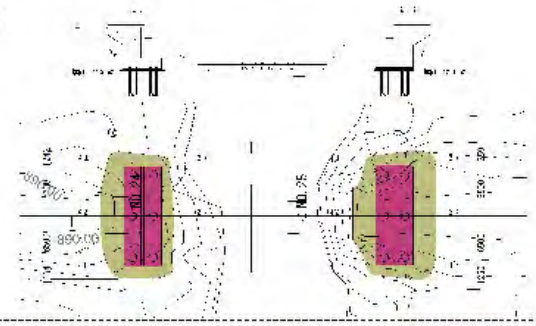
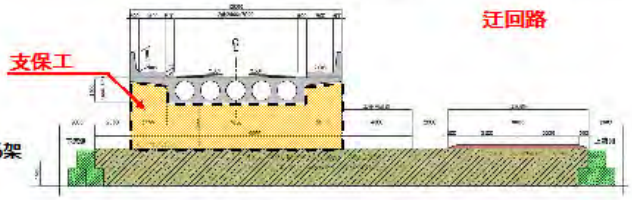
アンツァパザナ橋の施工

- **下部工・基礎工の施工**
  - ✓ 場所打ち杭基礎
    - Φ1.0m、L=14.5~22.5m
    - ベノト（ｵｰﾙｹｰｼﾝｸﾞ）工法
    - 杭本数　A1&A2　6本ずつ
  - ✓ 逆T式橋台
    - h＝5.0m、w＝12.0m
    - オープン掘削



- **上部工の架設**
  - ✓ PC中空床版橋
    - L=30m、w＝12.0m
    - 桁高 h=1.4m
  - ✓ 全支保工（固定式）による架設を想定



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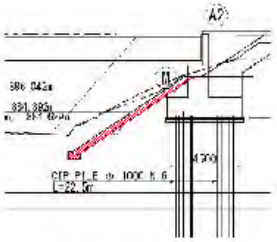
護岸工

- **護岸工**
  - ✓ 練石護岸
    - 勾配　1:1.5
    - 高さ　最大5m程度
    - 河床への根入れ　1.0m



マダガスカル国における護岸工の参考事例（国道7号線バイパス）

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キャンプヤードと土捨て場

- マングル橋にﾒｲﾝｷｬﾝﾌﾟ（事務所、宿舎、各種ﾌﾟﾗﾝﾄ、資機材置き場、駐機場等）、アンツァパザナ橋にｻﾌﾞｷｬﾝﾌﾟ（簡易事務所、資機材置き場、駐機場）を想定。現地実施機関に用地確保を要請中
- 土捨て場は、2橋とも同じ箇所を使用予定でアンツァパザナ橋から約1.5kmを予定（マングルから約11km）

マングル橋

アンツァパザナ橋

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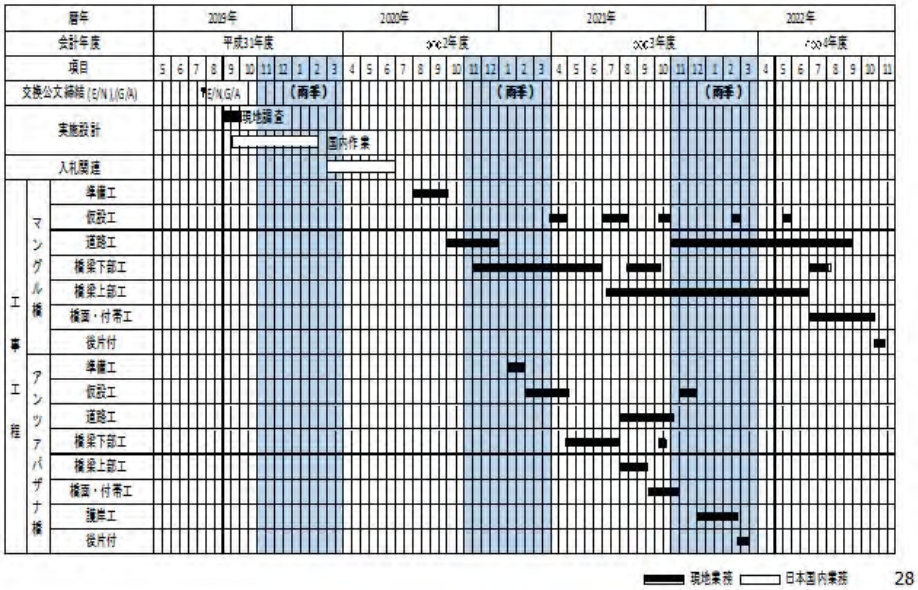
8. 事業実施スケジュール(案)



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9. 調達計画および工事数量

（1）主要建設資材

資　　材	現地調達	日本調達	備考
異形棒鋼		○	
仮設鋼材		○	
PC鋼材、定着装置		○	
鋼製型枠		○	PC箱桁橋架設
土砂、骨材、路盤材	○		
セメント、混和剤	○		
アスファルト混合物	○		
瀝青安定処理材	○		
ゴム支承、伸縮装置		○	

❖ **上記は、品質確保や調達の容易さを踏まえた、コンサルタントの積算上の想定。**

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（2）主要建設機材

建設機械	規格	現地調達	日本調達
ブルドーザ	普通・15t級	○	
バックホウ	0.8m3	○	
ダンプトラック	10t	○	
タイヤローラ	8~20t	○	
ロードローラ	マカダム 10~12t	○	
トラクタショベル	1.8m3	○	
コンクリートプラント	30m3/h	○	
アジテータ	4.4m3	○	
コンクリートポンプ車	ブーム式　90~110m3/h	○	
モータグレーダ	3.1m	○	
アスファルトフィニッシャ	2.4~6.0m	○	
クローラクレーン	60~65t		○
トラッククレーン	50t	○	
ラフテレーンクレーン	25t	○	
発動発電機	各種	○	
オールケーシング掘削機	全回転型、スキッド、1500mm		○
片持架設用移動作業車	一般型、2主桁、14m以下		○
緊張ジャッキ・ポンプ	各種		○

❖　上表は、品質確保や調達の容易さを踏まえた、コンサルタントの積算上の想定。

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輸送経路

本邦調達の資機材は、トアマシナ港から国道2号線経由で架橋位置まで輸送

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（3）工事数量（マングル橋）

種別	細別	規格	単位	施工数量	備考
仮設工	土工	築土	m3	800.00	
	大型土のう		袋	1,030.00	
道路工	土工	切土	m2	7,700.00	
		盛土	m3	2,600.00	路体、路床
	路盤	下層路盤	m2	7,710.00	t=350mm
		上層路盤	m2	7,350.00	t=200mm
		遮青安定処理	m2	7,200.00	t=100mm
	アスファルト舗装	車道・路肩、50mm x 2層	m2	6,760.00	改質
	擁壁工	重力式擁壁、1m~2m	m	10.00	
	U字側溝		m	1,150.00	
	パイプカルバート	コルゲートパイプ Φ800	m	15.00	
	ボックスカルバート	B2500 x H2200	m	6.00	ウイングあり
	路側工	縁石	m	600.00	
	ガードレール		m	151.00	
橋梁下部工	土工	軟岩、硬岩	m3	2000.00	A1,P1,P2,A2
	橋台工	逆T字式	基	2.00	
	橋脚工	壁式	基	2.00	
橋梁上部工	PC箱桁(3径間)	橋長=102m、40 N/mm2	m3	1,030.00	張出し仮設
	PC鋼材(縦)	12S15.2	t	29.00	
	PC鋼材(横)	1S28.6	t	11.00	
	ゴム支承	Bタイプ	個	8.00	
橋面工	高欄・地覆	24N/mm2、鉄筋構造物	m3	270.00	
	伸縮装置	伸縮量220mm	m	22.00	A1,A2
	アスファルト舗装(1)	車道部、40mm x 2層	m2	820.00	
	アスファルト舗装(2)	歩道部、30mm x 1層	m2	310.00	

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（3）工事数量（アンツァパザナ橋）

種別	細別	規格	単位	施工数量	備考
仮設工	迂回路	土工	m3	2,450.00	
	コルゲートパイプ	円形、1500mm	m	192.00	
	砂利舗装	t=200mm	m3	296.00	
	旧橋撤去	ポニートラス 30m	基	1.00	
道路工	土工	切土	m3	890.00	
		盛土	m3	620.00	路体、路床
	路盤	下層路盤	m2	1,240.00	t=350mm
		上層路盤	m2	1,140.00	t=200mm
		瀝青安定処理	m2	1,090.00	t=100mm
	アスファルト舗装	車道・路肩、50mm x 2層	m2	980.00	改質
	ガードレール		m	164.00	
橋梁下部工	土工	粘性土	m3	770.00	
	基礎工	場所打杭、D=1.0m、L=14.5m	本	6.00	A1
		場所打杭、D=1.0m、L=22.5m	本	6.00	A2
	橋台工	逆T字式	基	2.00	
橋梁上部工	PC中空床版橋	橋長=30m、35 N/mm2	m3	310.00	場所打ち
	PC鋼材	12S15.2	t	9.00	
	ゴム支承	Aタイプ	個	4.00	
橋面工	高欄・地覆	24 N/mm2, 鉄筋構造物	m3	80.00	
	伸縮装置	伸縮量=50mm	m	22.00	A1,A2
	アスファルト舗装(1)	車道部、40mm x 2層	m2	240.00	
	アスファルト舗装(2)	歩道部、30mm x 1層	m2	90.00	
護岸工	石張工	A1,A2 両岸	m2	800.00	

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10. 先方政府負担事項

(1) 我が国無償資金協力における一般事項

1） 日本に先方政府実施機関名義の口座開設、支払許可書（A/P）の発行及び手続きの費用負担

2） 事業実施に必要な用地の確保

3） 橋梁建設許可の取得

4） プロジェクトの為に調達される製品及び役務に課される関税、通関手数料、消費税、その他諸税の支払いの免除手続きの支援

5） 工事関係者への現地滞在に係るビザ取得支援

※ 上記は、主なものを記述

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10. 先方政府負担事項

(2) 本計画固有の事項

• EIAの実施、承認取得	2019.5
• 工事の影響を受ける施設・家屋の撤去 ﾏﾝｸﾞﾙ：移転無し、ｱﾝﾂｧﾊﾟｻﾞﾅ：民家5軒、	2020.2
• 土捨て場、および廃材処分場の提供	2020.2
• 資機材搬入路の維持管理（国道2号線）	常時
• 環境モニタリング計画の策定と承認	2019.11

※　**上記は、主なものを記述**

付加価値税（VAT）について

付加価値税の免税方法は還付制

施工業者が資材の内訳書及び領収書を添付した
返金要請書をMAHTP へ提出
↓
MAHTPが要請書内容を確認し財務省・外務省へ提出
↓
財務省が要請内容を確認し、施工業者の銀行口座へ返金

※　事前申請し、認められたものについては、
VATを支払わずに購入可能
例：工事で使用する燃油を大口で購入する場合

輸入品の関税率（例）について

品目	単位	関税率	付加価値税
重機	UNIT	5%	20%
重機の部品類	Kg	10%	20%
車輌	UNIT	20%	20%
セメント	Kg	10%	20%
鉄筋	Kg	10%	20%
コンクリート添加材	Kg	5%	20%
私的財貨	Kg	20%	20%
IT機器	Kg	10%	20%

※　上記は、主なものを記述

11. 安全管理情報

プロジェクト地域の危険レベル：
『レベル１：十分注意してください』

凡例：「レベル１：十分注意してください。」
・その国・地域への渡航、滞在に当たって危険を避けていただくため特別な注意が必要です。
「レベル２：不要不急の渡航は止めてください。」
・その国・地域への不要不急の渡航は止めてください。渡航する場合には特別な注意を払うとともに、十分な安全対策をとってください。
「レベル３：渡航は止めてください。（渡航中「勧告」）」
・その国・地域への渡航は、どのような目的であれ止めてください。（場合によっては、現地に滞在している日本人の方々に対して退避の可能性や準備を促すメッセージを含むことがあります。）
「レベル４：退避してください。渡航は止めてください。（退避勧告）」
・その国・地域に滞在している方は滞在地から、安全な国・地域へ退避してください。この状況では、当然のことながら、どのような目的であれ新たな渡航は止めてください。

出典：外務省海外安全ホームページ　https://www.anzen.mofa.go.jp/