

CONTRATO Nº 07/SRH-CE/2021:

ESTUDOS BÁSICOS E CONCEPÇÃO DO PROJETO, ESTUDOS ARQUEOLÓGICOS E DETALHAMENTO DO PROJETO EXECUTIVO DA BARRAGEM BERÉ, NO MUNICÍPIO DE JARDIM, ESTADO DO CEARÁ.

FASE A - ESTUDOS BÁSICOS E CONCEPÇÃO DA BARRAGEM

Volume 1 - Estudos Cartográficos - ANEXOS

Maio/2022



ANEXOS



ANEXO 1 - DADOS DA BASE RASTREADA



1.1 - Relatório de Rastreio - Base

Sumário do Processamento do marco: B02

Início: AAAA/MM/DD HH:MM:SS,SS	2021/09/01 10:21:51,00
Fim: AAAA/MM/DD HH:MM:SS,SS	2021/09/01 14:02:35,00
Modo de Operação do Usuário:	ESTÁTICO
Observação processada:	CÓDIGO & FASE
Modelo da Antena:	TPSHIPER_V NONE
Órbitas dos satélites: ¹	RÁPIDA
Frequência processada:	L3
Intervalo do processamento(s):	1,00
Sigma² da pseudodistância(m):	5,000
Sigma da portadora(m):	0,010
Altura da Antena³(m):	1,725
Ângulo de Elevação(graus):	10,000
Resíduos da pseudodistância(m):	2,13 GPS 2,73 GLONASS
Resíduos da fase da portadora(cm):	0,93 GPS 1,32 GLONASS

Coordenadas SIRGAS

	Latitude(gms)	Longitude(gms)	Alt. Geo.(m)	UTM N(m)	UTM E(m)	MC
Em 2000.4 (É a que deve ser usada) ⁴	-7° 39' 10,3810"	-39° 10' 39,3496"	529,75	9154072.043	480412.715	-39
Na data do levantamento ⁵	-7° 39' 10,3729"	-39° 10' 39,3518"	529,75	9154072.292	480412.648	-39
Sigma(95%)⁶ (m)	0,002	0,004	0,005			

Coordenada Altimétrica

Modelo:	hgeoHNOR_IMBITUBA	
Fator para Conversão (m):	-9,92	Incerteza (m): 0,07
Altitude Normal (m):	539,67	

Precisão esperada para um levantamento estático (metros)

Tipo de Receptor	Uma frequência		Duas frequências	
	Planimétrico	Altimétrico	Planimétrico	Altimétrico
Após 1 hora	0,700	0,600	0,040	0,040
Após 2 horas	0,330	0,330	0,017	0,018
Após 4 horas	0,170	0,220	0,009	0,010
Após 6 horas	0,120	0,180	0,005	0,008

¹ Órbitas obtidas do International GNSS Service (IGS) ou do Natural Resources of Canada (NRCAN).

² O termo "Sigma" é referente ao desvio-padrão.

³ Distância Vertical do Marco ao Plano de Referência da Antena (PRA).

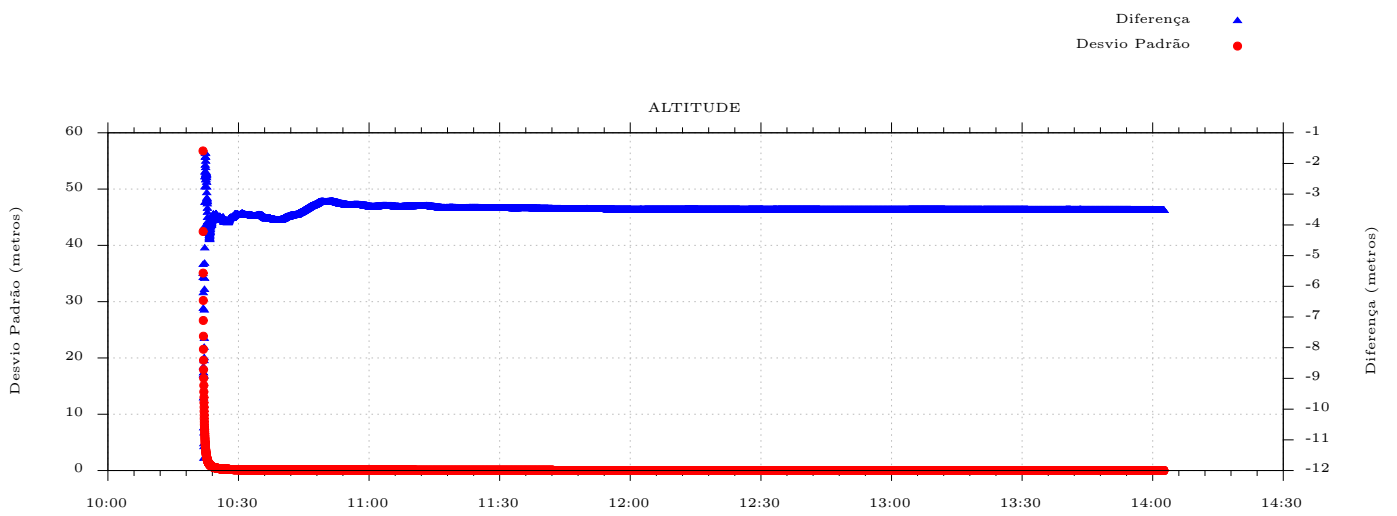
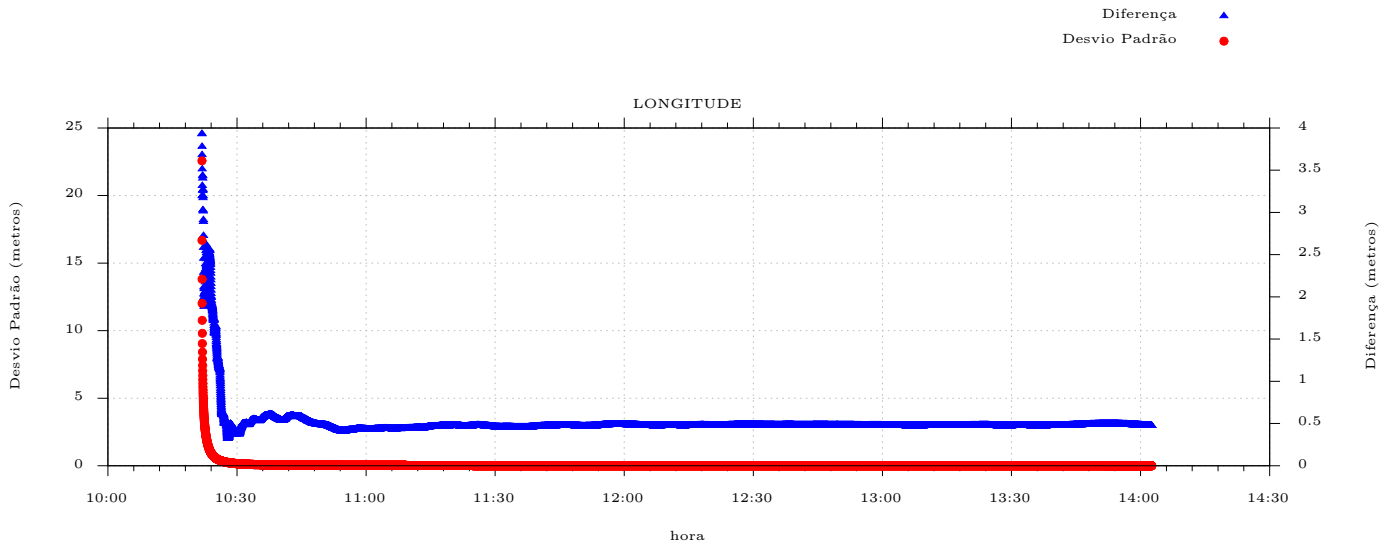
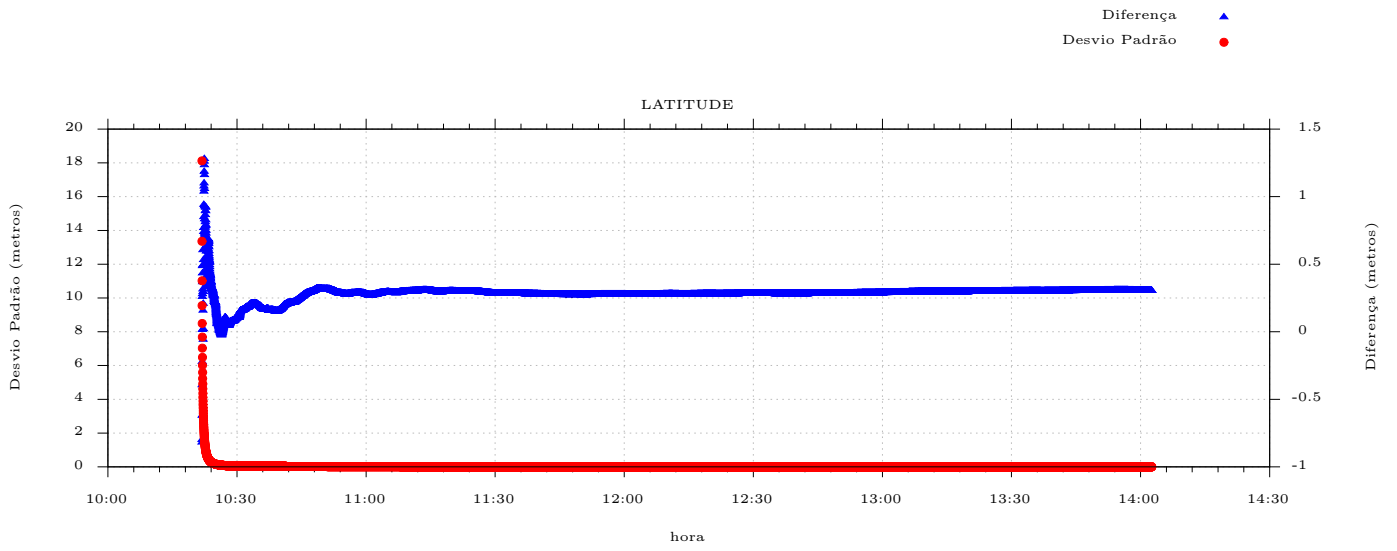
⁴ A coordenada oficial na data de referência do Sistema SIRGAS, ou seja, 2000.4. A redução de velocidade foi feita na data do levantamento, utilizando o modelo VEMOS em 2000.4.

⁵ A data de levantamento considerada é a data de início da sessão.

⁶ Este desvio-padrão representa a confiabilidade interna do processamento e não a exatidão da coordenada.

Os resultados apresentados neste relatório dependem da qualidade dos dados enviados e do correto preenchimento das informações por parte do usuário. Em caso de dúvidas, críticas ou sugestões contate: ibge@ibge.gov.br ou pelo telefone 0800-7218181.

Este serviço de posicionamento faz uso do aplicativo de processamento CSRS-PPP desenvolvido pelo Geodetic Survey Division of Natural Resources of Canada (NRCAN)





1.2 - Cadastro da Aeronave não Tripulada-ANAC



REPÚBLICA FEDERATIVA DO BRASIL
FEDERATIVE REPUBLIC OF BRAZIL

AGÊNCIA NACIONAL DE AVIAÇÃO CIVIL
NATIONAL CIVIL AVIATION AGENCY



CERTIDÃO DE CADASTRO DE AERONAVE NÃO TRIPULADA – USO NÃO RECREATIVO
UNMANNED AIRCRAFT INSCRIPTION CERTIFICATE – NON-RECREATIONAL

Esta certidão de cadastro, emitida de acordo com o RBAC-E nº 94, é válida até **07/06/2023**, salvo em caso de cancelamento, suspensão ou revogação pela Autoridade de Aviação Civil Brasileira.

*This Inscription Certificate, issued in accordance with RBAC-E nr. 94, shall remain valid **06/07/2023**, unless it is cancelled, suspended or revoked by the Brazilian Civil Aviation Authority.*

Operador (Operator)

G-PLANT ENGENHARIA LTDA

G-PLANT ENGENHARIA E CONSULTORIA

CNPJ (document):

22.188.385/0001-03

Nº do cadastro (Inscription Number):

PP-221883850

Uso (Purpose): não recreativo (non-recreational)

Ramo de atividade (Business): Aerolevanteamento

- Aerofotogrametria

Fabricante (Maker): DJI

Modelo (Model): MATRICE 210 V2

Nº de série (Serial Number): 17TDGB9013W187

Peso máximo de decolagem (MTOW): 6,14 kg

Foto (Picture):



Informações adicionais (additional information):

Modelo do Rádio Controle: GL900A - Nro Série:

1ANDG9NR01R5Y5

O descumprimento da regulamentação aplicável pode ensejar consequências administrativas, civis e/ou criminais para o infrator.

O usuário deve portar a Portaria de Inscrição e a Autorização de Aerolevanteamento Fase Aeroespacial (AAFA), ambas do Ministério da Defesa para a realização das atividades de Aerolevanteamento, conforme art. 4º do Decreto-Lei nº 1.177, de 21 de junho de 1971 e legislação correlata, disponível no sítio do MD na internet.

O detentor desta certidão de cadastro (o operador), ou aquele com quem for compartilhada sua aeronave, é considerado apto pela ANAC a realizar voos **recreativos e não recreativos** no Brasil, com a aeronave não tripulada acima identificada, em conformidade com os regulamentos aplicáveis da ANAC. É responsabilidade do operador tomar as providências necessárias para a operação segura da aeronave, assim como conhecer e cumprir os regulamentos do DECEA, da Anatel, e de outras autoridades competentes.

*The holder of this inscription certificate (the operator), or the person with whom this aircraft is shared, is considered apt by Brazilian Civil Aviation Authority to perform **recreational and non-recreational** flights in Brazil, using the above identified unmanned aircraft, in conformity with the applicable regulations of Brazilian Civil Aviation Authority. It's the operator's responsibility to take the necessary actions to ensure a safe operation, as well as know and comply with the regulations of air traffic control (ATC), telecommunications, and other competent authorities*

A validade desta certidão pode ser verificada pelo link

<https://sistemas.anac.gov.br/SISANT/Aeronave/ConsultarAeronave>

Local e data da emissão (*Place and date of issue*)

Brasília, 10 de junho de 2021

Brasília, June 10th, 2021

Esta certidão de cadastro não é válida para aeronaves não tripuladas acima de 25 kg de peso máximo de decolagem, ou em voos além da linha de visada visual (BVLOS) ou acima de 400 pés ou 120 metros acima do nível do solo (AGL).

This inscription certificate is not valid for unmanned aircraft of more than 25 kg maximum takeoff weight, or flying beyond visual line of sight (BVLOS) or over 400 feet or 120 meters above ground level (AGL).



1.3 - Certificado Anatel da Empresa Gplant



República Federativa do Brasil
Agência Nacional de Telecomunicações

Certificado de Homologação

(Intransferível)

Nº **03761-21-06500**

Validade: 19/03/2023

Emissão: 19/03/2021

Requerente:

CNPJ: 22.188.385/0001-03

G-PLANT ENGENHARIA LTDA

Fabricante:

SZ DJI TECHNOLOGY CO., LTD

14TH FLOOR, WEST WING, SKYWORTH SEMICONDUCTOR

Nº DESIGN BUILDING NO.18 GAOXIN SOUTH 4TH AVE,

CHINA

Este documento homologa, nos termos da regulamentação de telecomunicações vigente, a Declaração de Conformidade emitida pelo solicitante. Esta homologação é expedida em nome do solicitante aqui identificado e é válida somente para o produto a seguir discriminado, cuja utilização deve observar as condições estabelecidas na regulamentação de telecomunicações.

Tipo - Categoria:

Transceptor de Radiação Restrita - II

Modelo - Nome Comercial (s):

M210 V2 (DRONE) - (MATRICE 210 V2) /GL900A

Características técnicas básicas:

Faixa de Frequências Tx (MHz)	Potência Máxima de Saída (W)	Tecnologias
5.730,5 a 5.844,5	0,121	OUTRAS
5.735,5 a 5.839,5	0,113	OUTRAS
5.728,5 a 5.846,5	0,076	OUTRAS
2.403,5 a 2.477,5	0,448	OUTRAS

NÚMERO DE SÉRIE:

Quadróptero (DRONE): 17TDGB9013W187

Rádio Controle: 1ANDG9NR01R5Y5

Observações

Este certificado não poderá ser utilizado para fins de comercialização do produto.

A utilização do produto deve atender as condições estabelecidas pelo Departamento de Controle do Espaço Aéreo (DECEA) e pela Agência Nacional de Aviação Civil (ANAC).

Na instalação do produto devem ser observadas as condições de uso conforme estabelecido no Regulamento sobre Equipamentos de Radiocomunicação de Radiação Restrita.

Constitui obrigação do fabricante do produto no Brasil providenciar a identificação do produto homologado, nos termos da regulamentação de telecomunicações, em todas as unidades comercializadas, antes de sua efetiva distribuição ao mercado, assim como observar e manter as características técnicas que fundamentaram a certificação original.

As informações constantes deste certificado de homologação podem ser confirmadas no SCH - Sistema de Gestão de Certificação e Homologação, disponível no portal da Anatel. (www.anatel.gov.br).

Davison Gonzaga da Silva

Gerente de Certificação e Numeração



1.4 - Seguro Aeronáutico de Responsabilidade Civil

CERTIFICADO DE SEGURO AERONÁUTICO

Seguro de Responsabilidade Civil do Explorador ou Transportador Aéreo (RETA)

Nr. Processo Susep: 15414.900644/2018-42; 15414.900644/2018-42;

Ramo: 1597

Proposta Nº 44600104785636872

Certificamos que pela Proposta acima indicada, o(a)
Localidade no seguinte endereço:G-Plant Engenharia LTDA
AV CORONEL CÍCERO SÁ, 1497, PARQUE
HAVAÍ, EUSEBIO, Ceará
22.188.385/0001-03e com o Código Nacional de Pessoa Jurídica (CNPJ) n.º
segura nesta Companhia Seguradora,
a AeronavePP-21883850, DJI, MATRICE 210 V2,
2021, 17TDGB9013W187, 7

pelo prazo de 1 (hum) ano, com início de vigência em

à partir das 24:00hs do dia 13/04/2021 00:00:00 das
24:00hs do dia 13/04/2022 00:00:00

SEGURO R.E.T.A.

QUADRO DE RESPONSABILIDADE

COBERTURAS	LIMITES POR COBERTURA	LIMITES Nº ASSENTOS E COLO	LIMITES MÁXIMOS DE INDENIZAÇÃO
1. - Cobertura Básica Nº01 - Passageiro e Bagagens de Mão.			
1.1. - Cobertura de Passageiros	R\$ 0,00	0	R\$ 0,00
1.2. - Cobertura de Bagagem de Mão de Passageiros	R\$ 0,00	0	R\$ 0,00
2. - Cobertura Básica Nº02 - Tripulantes e Bagagens de Mão			
2.1. - Cobertura de Tripulantes	R\$ 0,00	0	R\$ 0,00
2.2. - Cobertura de Bagagem de Mão de Tripulantes	R\$ 0,00	0	R\$ 0,00
3. - Cobertura Básica Nº03 - Danos pessoais e/ou danos materiais, causados a terceiros não transportados, na superfície.	R\$ 78.475,63		R\$ 78.475,63
4. - Cobertura Básica Nº04 - Abaloamento.			
4.1. - Por Pessoa Vitimada em aeronaves abalroadas	R\$ 156.951,28		por pessoa vitimada
4.2. - Bagagens por Passageiro/Tripulante em aeronaves abalroadas	R\$ 6.726,39		por bagagem de passageiro/tripulante
4.3. - Carga Despachada (por quilo) em aeronaves abalroadas	R\$ 131,87		por quilo
4.4. - Danos causados à terceiros, na superfície, pelas aeronaves abalroadas até 1.000Kg	R\$ 156.951,28		R\$ 156.951,28
4.5. - Danos causados à terceiros, na superfície, pelas aeronaves abalroadas acima 1.000Kg	R\$ 4,55		R\$ 4,55
4.6. - Danos causados a aeronaves abalroadas	R\$ 156.951,28		por aeronave abalroadada
4.7. - Prejuízos financeiros e Lucros cessantes de privação das aeronaves abalroadas	R\$ 5.418,82		por aeronave abalroadada
5. - Cobertura Básica Nº05 - Danos a Carga e Bagagens Despachadas decorrente de acidente (*)			
5.1. - Bagagem Despachada (por passageiro)	R\$ 0,00	0	R\$ 0,00
5.2. - Carga Despachada (por quilo)	R\$ 0,00		por quilo
6. - Cobertura Básica Nº06 - Cancelamento de Voo, Atraso ou Preterição de Embarque (**)	R\$ 0,00		R\$ 0,00
7. - Cobertura Adicional - Defesa em Juízo Civil (por ocorrência)	R\$ 0,00		R\$ 0,00

(*) Exclusivo para empresas que prestam serviços de Transporte Aéreo Público, regular ou não, inclusive Táxi Aéreo.

(**) Exclusivo para empresas que prestam Serviço de Transporte Aéreo Regular - Linha Aérea

LMG - Limite Máximo de Garantia	561.606,55
Prêmio Líquido	Prêmio Total
460,88	494,90

Segurado Adicional: NÃO DECLARADO

CPF/CNPJ do Segurado Adicional: NÃO DECLARADO

Utilização: DRONE

Este Certificado de Seguro somente será válido mediante comprovação de pagamento do respectivo seguro.

Observações Gerais

- Em atendimento à Lei 12.741/12 informamos que incidem as alíquotas de 0,65% de PIS/Pasep e de 4% de COFINS sobre os prêmios de seguros, deduzidos do estabelecido em legislação específica.
- As Condições Gerais deste produto encontram-se no portal www.mapfre.com.br, na área Condições Gerais

INFORMAÇÕES SOBRE A SUSEP:

- Número de telefone gratuito de atendimento ao público SUSEP: 0800-021-8484 (atendimento exclusivo ao consumidor de todo Brasil)
- As condições contratuais/ regulamento deste produto protocolizadas pela sociedade/entidade junto à SUSEP poderão ser consultadas no endereço eletrônico www.susep.gov.br, de acordo com o número de processo constante da proposta/apólice ou link <http://susep.gov.br/menu/servicos-ao-cidadao/sistema-de-consulta-publica-de-produtos>.
- O segurado poderá consultar a situação cadastral de seu corretor de seguros, no site www.susep.gov.br, por meio do número de seu registro na SUSEP, nome completo, CNPJ ou CPF.
- O registro deste plano na SUSEP não implica, por parte da Autarquia, incentivo ou recomendação a sua comercialização.
- SUSEP - Superintendência de Seguros Privados - Autarquia Federal responsável pela fiscalização, normatização e controle dos mercados de seguro, previdência complementar aberta, capitalização, resseguro e corretagem de seguros.

Mapfre Seguros Gerais S.A.

Código: 6238

SEDE BB MAPFRE

Av. das Nações Unidas, 14.261 - Ala A

Cód. Sucursal: 2194

Nome da Sucursal: SUC NOVA IGUACU

Endereço: R ATAIDE PIMENTA DE MORAES

Cidade: NOVA IGUACU

UF: RJ

CEP: 26210190

Cod. Corretor: 104785

Cod. Susep: 00000202018472; 00000202018472;


Corretor: AEROCONSULT CORRETORA DE SEGUROS LTDA **Telefone:** 21 995901438

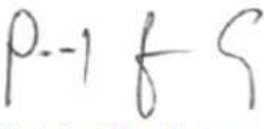
Razão Social: MAPFRE Seguros Gerais S.A. - CNPJ: 61.074.175/0001-38
Endereço: Avenida das Nações Unidas, 14.261 - Ala A - 29º andar - Vila Gertrudes - CEP: 04794-000 - São Paulo / SP - Código SUSEP: 6238
Serviço de Atendimento ao Cliente (SAC): 0800 775 4545, disponível todos os dias, 24 horas
Serviço de Atendimento ao Cliente (SAC) deficiente auditivo e de fala: 0800 775 5045, disponível todos os dias, 24 horas
Ouvidoria: 0800 775 1079, disponível de segunda à sexta, das 08h às 18h (exceto feriados)
Ouvidoria para deficientes auditivo e de fala: 0800 962 7373, disponível de segunda à sexta, das 08h às 18h (exceto feriados) –
Site: www.mapfre.com.br
 Ouvidoria poderá ser acionada para atuar na defesa dos direitos dos consumidores, para prevenir, esclarecer e solucionar conflitos não atendidos pelos canais de atendimento habituais.

Prêmio Líquido: 460,88 **Prêmio Total:** 494,90
Cód. Plano: 1 - 1 FCA

Primeira Parc:	Demais Parc:	Subsídio Federal	Subsídio Estadual
494,90	0,00	0,00	0,00

Este Certificado de Seguro somente será válido mediante apresentação do comprovante de pagamento EUSEBIO, 13/04/2021


Raphael de Luca Júnior
 Diretor


Wady José Mourão Cury
 Diretor

SR, CORRETOR, FAVOR ANEXAR ESTA PARTE NA PROPOSTA (VIA SEGURADORA) ANTES DA QUITAÇÃO
Produto: Aeronáutico (Reta) **NR. PROPOSTA (LOCAL):** 44600104785636872

NR. PROPOSTA SERVER: **VIGÊNCIA:** 13/04/2021 a 13/04/2022

SEGURADO: G-PLANT ENGENHARIA LTDA **CPF/CNPJ:** 22.188.385/0001-03

NR FCA: 27881023148736532 **VALOR (R\$):** 494,90

VENCIMENTO: 18/04/2021 **CORRETOR:** 104785 - AEROCONSULT CORRETORA DE SEGUROS LTDA

DATA E HORA DA IMPRESSÃO: 13/04/2021 16:26:38

MAPFRE | **001-9** | **Recibo do Pagador**

Local de Pagamento Pagável em qualquer banco até o vencimento.					Vencimento 18/04/2021
Beneficiário MAPFRE SEGUROS GERAIS S.A. - 61.074.175/0001-38					Agência Código Beneficiário 1912-7/105521-6
Data do Documento 13/04/2021	Número do Documento 27881023148736532	Espécie Doc. AS	Aceite N	Data Processamento 13/04/2021	Nosso Número 27881023148736532
Uso do Banco	Carteira 17-019	Espécie R\$	Quantidade	Valor	Valor do Documento 494,90
Instruções: (Texto de responsabilidade do beneficiário) APÓS O VENCIMENTO NÃO SERÁ ACEITO O PAGAMENTO EM AGÊNCIA BANCÁRIA; A PARCELA DO SEGURO NÃO SERÁ QUITADA ATRAVÉS DE DOC OU DEPÓSITO; SR, CAIXA, NÃO RECEBER ESTE DOCUMENTO SE O MESMO APRESENTAR RASURA E/OU SE O VALOR ESTIVER GRAFADO A MÃO; ESTA FICHA DE COMPENSAÇÃO PODERÁ SER UTILIZADA SOMENTE PARA O PAGAMENTO DA PROPOSTA NÚMERO: 44600104785636872.					(-) Desconto / Abatimento 0,00
					(-) Outras Deduções 0,00
					(+) Mora / Multa 0,00
					(+) Outros Acréscimos 0,00
					Valor Cobrado 494,90
Pagador G-PLANT ENGENHARIA LTDA AV CORONEL CÍCERO SÁ, 1497 SALA E4 CEP: 61760-000 EUSEBIO - CE					CNPJ/CPF : 22.188.385/0001-03

Autenticação Mecânica

MAPFRE | **001-9** | **00190.00009 02788.102313 48736.532176 4 85940000049490**

Local de Pagamento Pagável em qualquer banco até o vencimento.					Vencimento 18/04/2021
Beneficiário MAPFRE SEGUROS GERAIS S.A. - 61.074.175/0001-38					Agência Código Beneficiário 1912-7/105521-6
Data do Documento 13/04/2021	Número do Documento 27881023148736532	Espécie Doc. AS	Aceite N	Data Processamento 13/04/2021	Nosso Número 27881023148736532
Uso do Banco	Carteira 17-019	Espécie R\$	Quantidade	Valor	Valor do Documento 494,90
Instruções: (Texto de responsabilidade do beneficiário) APÓS O VENCIMENTO NÃO SERÁ ACEITO O PAGAMENTO EM AGÊNCIA BANCÁRIA; A PARCELA DO SEGURO NÃO SERÁ QUITADA ATRAVÉS DE DOC OU DEPÓSITO; SR, CAIXA, NÃO RECEBER ESTE DOCUMENTO SE O MESMO APRESENTAR RASURA E/OU SE O VALOR ESTIVER GRAFADO A MÃO; ESTA FICHA DE COMPENSAÇÃO PODERÁ SER UTILIZADA SOMENTE PARA O PAGAMENTO DA PROPOSTA NÚMERO: 44600104785636872.					(-) Desconto / Abatimento 0,00
					(-) Outras Deduções 0,00
					(+) Mora / Multa 0,00
					(+) Outros Acréscimos 0,00
					Valor Cobrado 494,90
Pagador G-PLANT ENGENHARIA LTDA AV CORONEL CÍCERO SÁ, 1497 SALA E4 CEP: 61760-000 EUSEBIO - CE					CNPJ/CPF : 22.188.385/0001-03

Autenticação Mecânica / Ficha de Compensação





1.5 – Art dos Serviços de Coleta de Pontos de Controle de Campo



Anotação de Responsabilidade Técnica - ART
Lei nº 6.496, de 7 de dezembro de 1977

CREA-CE

ART OBRA / SERVIÇO
Nº CE20220932831

Conselho Regional de Engenharia e Agronomia do Ceará

INICIAL

1. Responsável Técnico

GERLANE BARBOSA LIMA

Título profissional: **ENGENHEIRA CIVIL**

RNP: **0618847642**

Registro: **344331CE**

Empresa contratada: **G-PLANT ENGENHARIA LTDA**

Registro: **0010437401-CE**

2. Dados do Contrato

Contratante: **IBI ENGENHARIA CONSULTIVA S/S**

CPF/CNPJ: **00.392.460/0001-02**

RUA SILVA JATAHY

Nº: **15**

Complemento: **7 ANDAR**

Bairro: **MEIRELES**

Cidade: **FORTALEZA**

UF: **CE**

CEP: **60165070**

Contrato: **Não especificado**

Celebrado em:

Valor: **R\$ 7.500,00**

Tipo de contratante: **Pessoa Jurídica de Direito Privado**

Ação Institucional: **NENHUMA - NÃO OPTANTE**

3. Dados da Obra/Serviço

RODOVIA CE-153

Nº: **S/N**

Complemento:

Bairro: **ZONA RURAL**

Cidade: **JARDIM**

UF: **CE**

CEP: **63290000**

Data de Início: **02/09/2021**

Previsão de término: **15/02/2022**

Coordenadas Geográficas: **-7.657915, -39.178316**

Finalidade: **SEM DEFINIÇÃO**

Código: **Não Especificado**

Proprietário: **IBI ENGENHARIA CONSULTIVA S/S**

CPF/CNPJ: **00.392.460/0001-02**

4. Atividade Técnica

	Quantidade	Unidade
14 - Elaboração		
40 - Estudo > AGRIMENSURA > AEROFOTOGRAMETRIA > #36.2.1 - DE PLANEJAMENTO DE VOO PARA AEROFOTOGRAMETRIA	3,93	km2
40 - Estudo > AGRIMENSURA > AEROFOTOGRAMETRIA > #36.2.2 - DE LEVANTAMENTO AEROFOTOGRAMÉTRICO	3,93	km2
40 - Estudo > AGRIMENSURA > AEROFOTOGRAMETRIA > #36.2.3 - DE APOIO TERRESTRE PARA AEROFOTOGRAMETRIA	3,93	km2
40 - Estudo > AGRIMENSURA > AEROFOTOGRAMETRIA > #36.2.6 - DE ORTOFOTO MOSAICO - AEROFOTOGRAMETRIA	3,93	km2
40 - Estudo > TOPOGRAFIA > LEVANTAMENTOS TOPOGRÁFICOS BÁSICOS > DE LEVANTAMENTO TOPOGRÁFICO > #33.1.1.3 - PLANIALTIMÉTRICO	3,93	km2
40 - Estudo > GEODÉSIA > GEORREFERENCIAMENTO > DE GEORREFERENCIAMENTO > #34.6.1.2 - RURAL	3,93	km2
40 - Estudo > TOPOGRAFIA > LEVANTAMENTOS TOPOGRÁFICOS BÁSICOS > #33.1.5 - DE CURVAS DE NÍVEL TOPOGRÁFICAS	3,93	km2

Após a conclusão das atividades técnicas o profissional deve proceder a baixa desta ART

5. Observações

ELABORAÇÃO DOS ESTUDOS DE AEROFOTOGRAMETRIA COM EXECUÇÃO DE VÔO, GERAÇÃO DE MODELO DIGITAL DO TERRENO (MDT) E EXTRAÇÃO DE CURVAS DE NÍVEL PARA ELABORAÇÃO DO PROJETO EXECUTIVO DA BARRAGEM BERÊ NO MUNICÍPIO DE JARDIM CEARÁ

6. Declarações

7. Entidade de Classe

CLUBE DE ENGENHARIA DO CEARÁ (CEC)

A autenticidade desta ART pode ser verificada em: <https://crea-ce.sitac.com.br/publico/>, com a chave: cDd2C
 Impresso em: 09/02/2022 às 09:18:50 por: , ip: 164.163.24.123





Anotação de Responsabilidade Técnica - ART
Lei nº 6.496, de 7 de dezembro de 1977

CREA-CE

ART OBRA / SERVIÇO
Nº CE20220932831

Conselho Regional de Engenharia e Agronomia do Ceará

INICIAL

8. Assinaturas

Declaro serem verdadeiras as informações acima

_____, _____ de _____ de _____
 Local data

Gerlane Barbosa Lima

GERLANE BARBOSA LIMA - CPF: 008.836.863-76

IBI ENGENHARIA CONSULTIVA S/S - CNPJ: 00.392.460/0001-02

9. Informações

* A ART é válida somente quando quitada, mediante apresentação do comprovante do pagamento ou conferência no site do Crea.

10. Valor

Valor da ART: **R\$ 88,78** Registrada em: **08/02/2022** Valor pago: **R\$ 88,78** Nosso Número: **8215138109**

A autenticidade desta ART pode ser verificada em: <https://crea-ce.sitac.com.br/publico/>, com a chave: cDd2C
 Impresso em: 09/02/2022 às 09:18:50 por: , ip: 164.163.24.123





1.6 – Arquivo Rimex

2.11 GLONASS NAV DATA RINEX VERSION / TYPE
TPS2RIN 1.0.24.1826 TPS-USER 06-SEP-21 15:13 PGM / RUN BY / DATE
win32 build Mar 20, 2019 (c) Topcon Positioning Systems COMMENT
B02.tps COMMENT
18 LEAP SECONDS
END OF HEADER

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2.11      N: GPS NAV DATA          RINEX VERSION / TYPE
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win32 build Mar 20, 2019 (c) Topcon Positioning Systems  COMMENT
B02.tps                                     COMMENT
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 7.7824D+04 3.2768D+04 -6.5536D+04 -1.9661D+05  ION BETA
1.862645149231D-09 8.881784197001D-16 503808 2173 DELTA-UTC: A0,A1,T,W
18                                           LEAP SECONDS
                                           END OF HEADER
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8.028000593185D-07 5.369515391067D-03 6.891787052155D-06 5.153648904800D+03
3.096000000000D+05-6.332993507385D-08-2.036497267691D+00 3.352761268616D-08
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2.000000000000D+00 0.000000000000D+00 3.725290298462D-09 2.700000000000D+01
3.024000000000D+05 4.000000000000D+00
19 21 9 1 14 0 0.0 4.725111648440D-05 5.002220859751D-12 0.000000000000D+00
4.600000000000D+01 5.493750000000D+01 4.224461680071D-09 7.385605779554D-01
2.790242433548D-06 9.169132215902D-03 4.641711711884D-06 5.153650259018D+03
3.096000000000D+05-9.872019290924D-08 1.408983566621D-01-1.564621925354D-07
9.802767386552D-01 3.017500000000D+02 1.932453168991D+00-8.164982961457D-09
1.857220217820D-10 1.000000000000D+00 2.173000000000D+03 0.000000000000D+00
2.000000000000D+00 0.000000000000D+00-1.536682248116D-08 4.600000000000D+01

3.034800000000D+05 4.000000000000D+00
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6.000000000000D+01-8.859375000000D+01 4.480186617756D-09-1.306668029980D+00
-4.518777132034D-06 6.115920259617D-03 8.029863238335D-06 5.153583341599D+03
3.096000000000D+05 1.024454832077D-07 2.091698165613D+00 1.005828380585D-07
9.573742660467D-01 2.220000000000D+02 9.808665535776D-01-7.950331163205D-09
2.464388365953D-11 1.000000000000D+00 2.173000000000D+03 0.000000000000D+00
2.000000000000D+00 0.000000000000D+00-1.117587089539D-08 6.000000000000D+01
3.079200000000D+05 4.000000000000D+00
13 21 9 1 14 0 0.0 1.794085837901D-04 5.343281372916D-12 0.000000000000D+00
7.400000000000D+01-4.031250000000D+00 4.323394372444D-09-2.223273026440D+00
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2.000000000000D+00 0.000000000000D+00-1.117587089539D-08 7.400000000000D+01
3.081300000000D+05 4.000000000000D+00
5 21 9 1 16 0 0.0-5.301320925355D-05-1.250555214938D-12 0.000000000000D+00
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-4.371628165245D-06 6.115571944974D-03 8.380040526390D-06 5.153581747055D+03
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2.000000000000D+00 0.000000000000D+00-1.117587089539D-08 6.900000000000D+01
3.096000000000D+05 4.000000000000D+00
6 21 9 1 16 0 0.0 6.635999307036D-05 6.934897101019D-12 0.000000000000D+00
1.070000000000D+02-4.568750000000D+01 4.213746948045D-09-2.562864973682D+00
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3.096000000000D+05 4.000000000000D+00
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2.000000000000D+00 0.000000000000D+00-1.117587089539D-08 7.800000000000D+01
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3.096000000000D+05 4.000000000000D+00

17 21 9 1 16 0 0.0 4.982748068869D-04 5.798028723802D-12 0.000000000000D+00
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2.000000000000D+00 0.000000000000D+00-1.117587089539D-08 3.500000000000D+01
3.096000000000D+05 4.000000000000D+00

19 21 9 1 16 0 0.0 4.728697240353D-05 5.002220859751D-12 0.000000000000D+00
4.700000000000D+01 5.584375000000D+01 4.069812381164D-09 1.788728706222D+00
2.831220626831D-06 9.169157827273D-03 4.438683390617D-06 5.153650691986D+03
3.168000000000D+05 2.160668373108D-07 1.408409020175D-01-5.029141902924D-08
9.802794933299D-01 3.030312500000D+02 1.932477440265D+00-7.838897950136D-09
1.592923494515D-10 1.000000000000D+00 2.173000000000D+03 0.000000000000D+00
2.000000000000D+00 0.000000000000D+00-1.536682248116D-08 4.700000000000D+01
3.096000000000D+05 4.000000000000D+00

20 21 9 1 16 0 0.0 5.193487741053D-04-2.273736754432D-13 0.000000000000D+00
8.800000000000D+01-9.003125000000D+01 4.997351016872D-09-1.680890094997D+00
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9.286101089098D-11 1.000000000000D+00 2.173000000000D+03 0.000000000000D+00
2.799999952316D+00 0.000000000000D+00-8.381903171539D-09 8.800000000000D+01
3.096000000000D+05 4.000000000000D+00

28 21 9 1 16 0 0.0 5.091535858810D-04-7.048583938740D-12 0.000000000000D+00
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2.799999952316D+00 6.300000000000D+01-1.117587089539D-08 6.200000000000D+01
3.096000000000D+05 4.000000000000D+00

30 21 9 1 16 0 0.0-4.684356972575D-04-3.979039320257D-12 0.000000000000D+00
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9.363762933397D-01 2.384062500000D+02-2.732019992422D+00-8.209984835965D-09
-2.689397738497D-10 1.000000000000D+00 2.173000000000D+03 0.000000000000D+00
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3.096000000000D+05 4.000000000000D+00

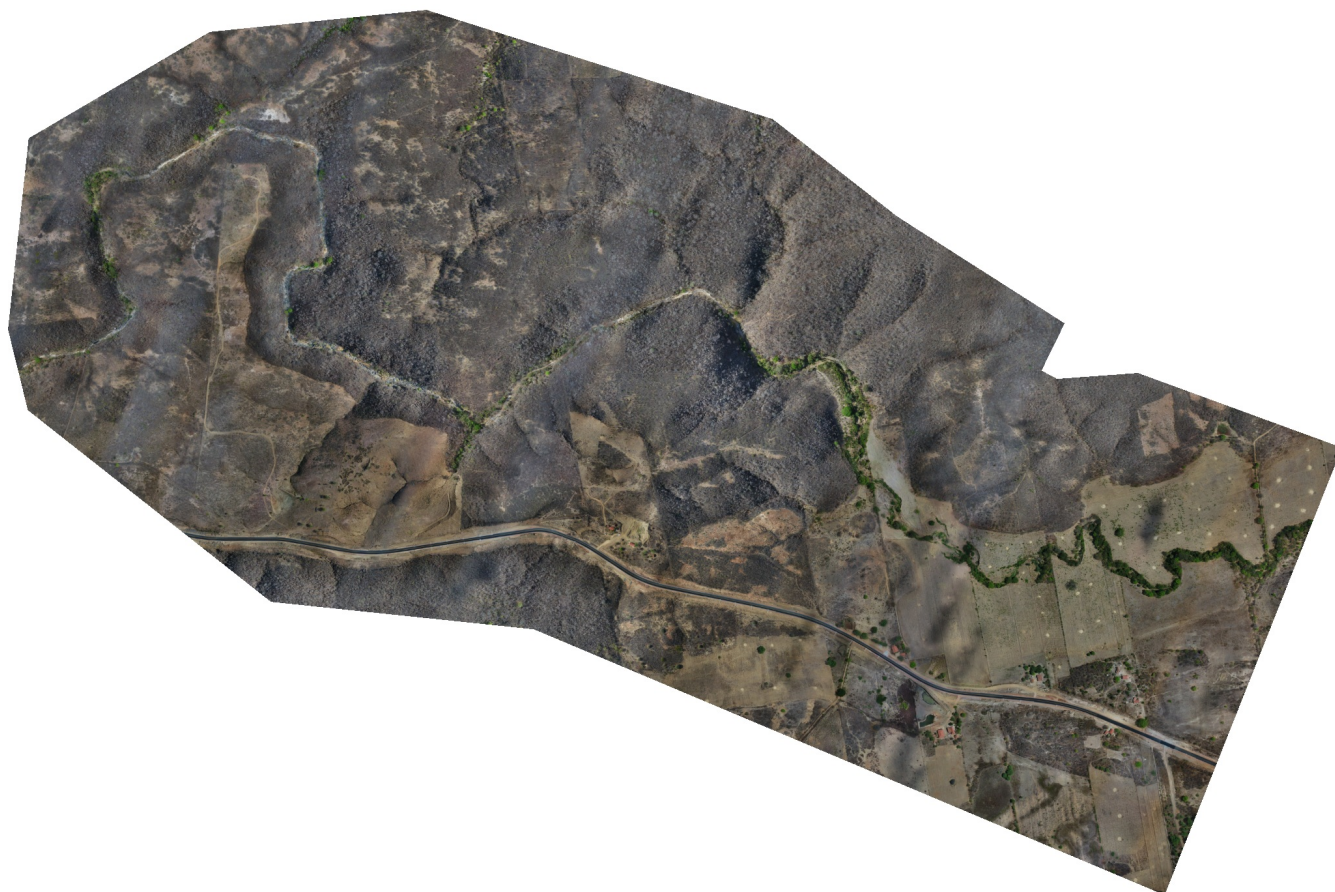


1.7 – Relatório de Processamento das Imagens de Drone

AGISOFT METASHAPE

RELATÓRIO DE PROCESSAMENTO DE IMAGENS DE DRONE BARRAGEM BERÉ.

06 December 2021



Survey Data

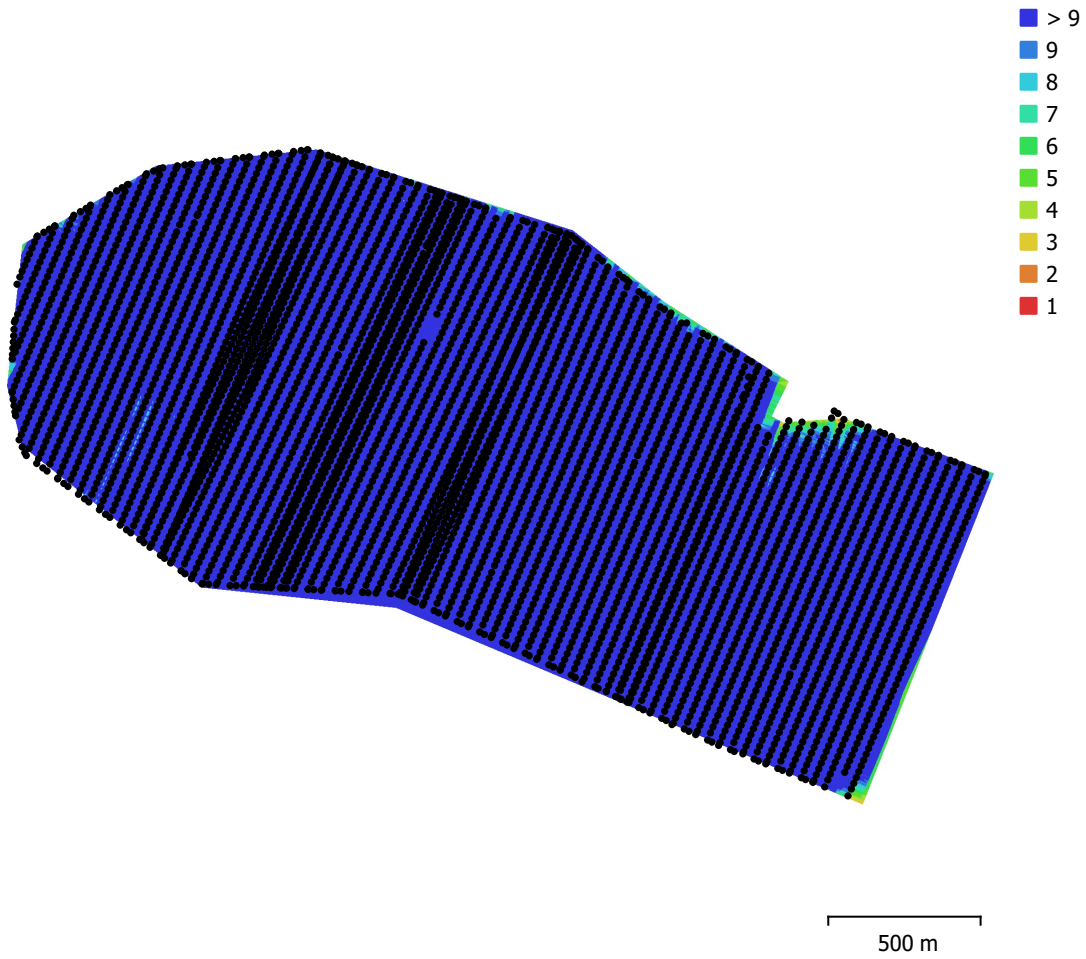


Fig. 1. Camera locations and image overlap.

Number of images:	5,404	Camera stations:	5,404
Flying altitude:	153 m	Tie points:	4,441,192
Ground resolution:	3.22 cm/pix	Projections:	20,970,101
Coverage area:	3.93 km ²	Reprojection error:	1.21 pix

Camera Model	Resolution	Focal Length	Pixel Size	Precalibrated
FC6520, DJI MFT 15mm ...	5280 x 3956	15 mm	3.28 x 3.28 μm	No

Table 1. Cameras.

Camera Calibration

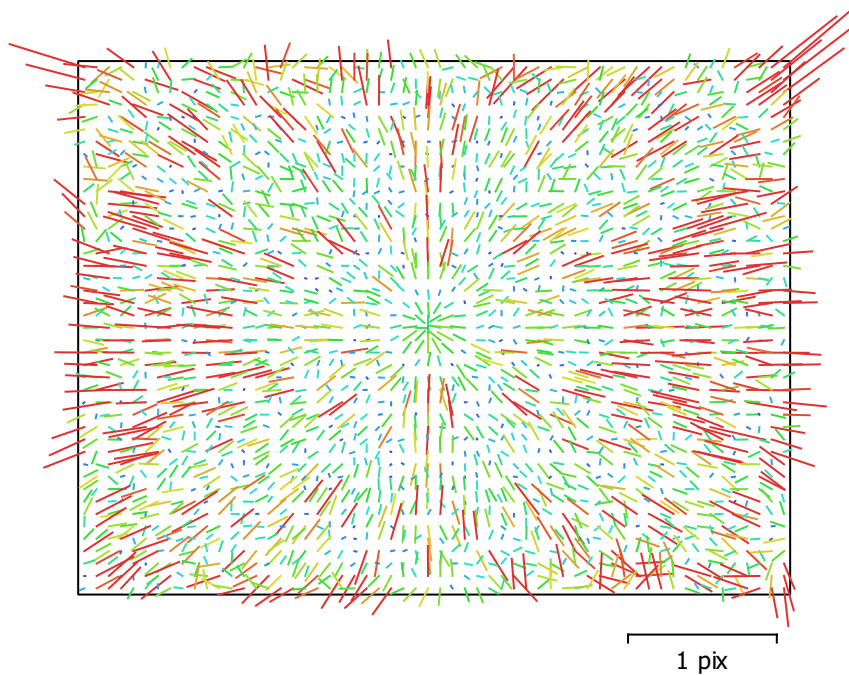


Fig. 2. Image residuals for FC6520, DJI MFT 15mm F1.7 ASPH (15mm).

FC6520, DJI MFT 15mm F1.7 ASPH (15mm)

5404 images, rolling shutter, additional corrections

Type	Resolution	Focal Length	Pixel Size
Frame	5280 x 3956	15 mm	3.28 x 3.28 μm
F:	4510.61		
Cx:	162.057	B1:	0
Cy:	-57.245	B2:	0
K1:	0.0175071	P1:	0.0116582
K2:	-0.0770646	P2:	-0.00132192
K3:	0.138222	P3:	0
K4:	-0.0812402	P4:	0

Ground Control Points

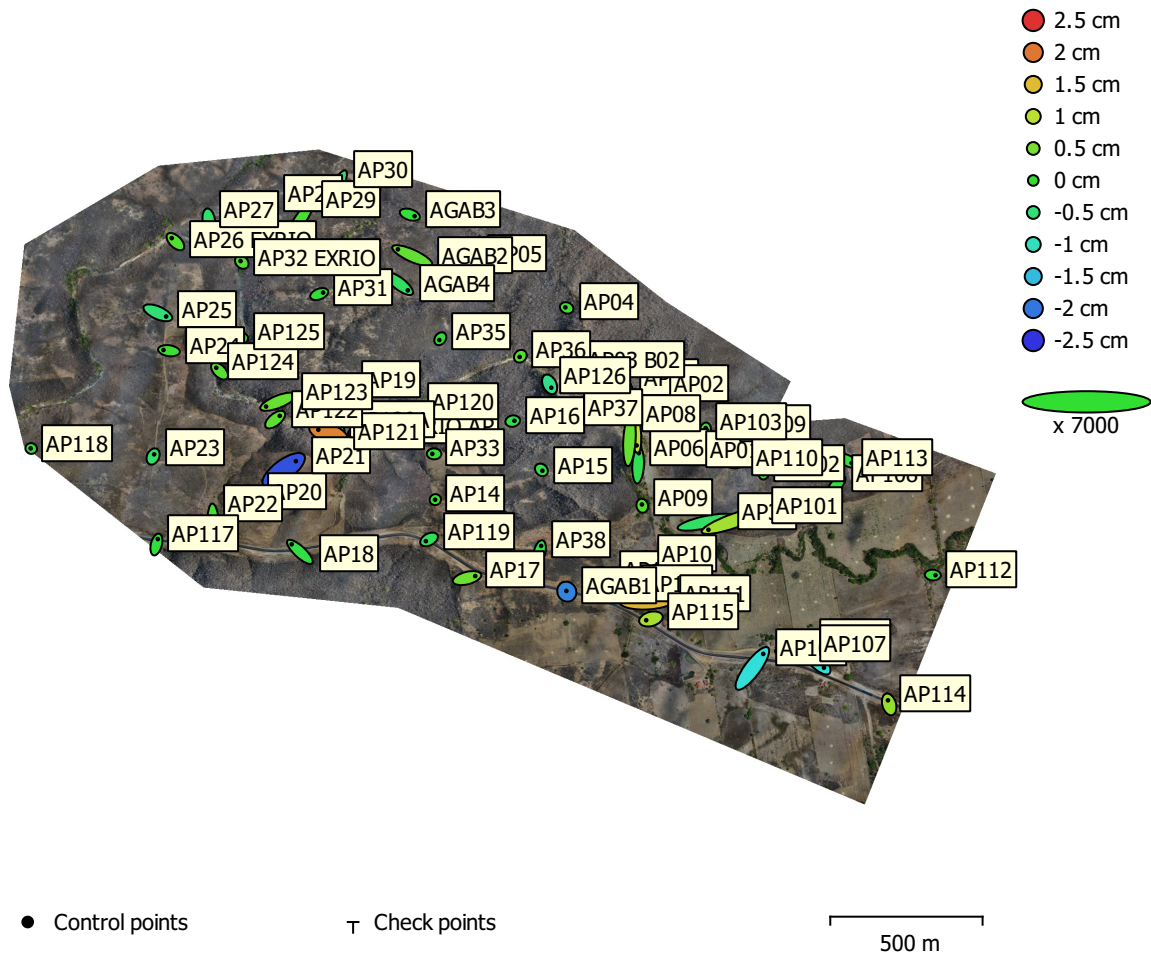


Fig. 3. GCP locations and error estimates.

Z error is represented by ellipse color. X,Y errors are represented by ellipse shape.

Estimated GCP locations are marked with a dot or crossing.

Count	X error (cm)	Y error (cm)	Z error (cm)	XY error (cm)	Total (cm)
67	0.69547	0.675255	0.736945	0.969355	1.21768

Table 2. Control points RMSE.

X - Easting, Y - Northing, Z - Altitude.

Label	X error (cm)	Y error (cm)	Z error (cm)	Total (cm)	Image (pix)
AP06	0.0629472	1.15085	-0.222656	1.17388	0.492 (51)
AP07	0.493577	-2.87592	1.01766	3.09033	0.755 (34)
AP01	-1.0387	-0.132547	-0.898418	1.37972	0.490 (45)
EXRIO AP	1.19005	0.0757726	1.39114	1.83228	0.498 (59)
AP02	-0.156952	-0.279727	-0.131683	0.34673	0.194 (25)
AP04	-0.125993	0.0513083	0.0890778	0.162609	0.280 (29)
AP05	-0.0123554	-0.103904	-0.0185874	0.106274	0.070 (12)
AP03 B02	-0.0114603	-0.390527	-0.345237	0.521375	0.422 (27)
AP08	0.110108	1.8929	0.382335	1.93426	0.510 (29)
AP09	-0.0288294	0.121784	0.207538	0.242352	0.365 (47)
AP11	0.362038	-0.165252	0.0694723	0.403988	0.548 (46)
AP14	-0.0228243	-0.00867449	0.0648787	0.0693213	0.628 (25)
AP15	0.0908357	-0.0789899	-0.189886	0.224827	0.364 (22)
AP16	0.161203	0.0330513	-0.156136	0.226842	0.417 (26)
AP18	-0.768521	0.712384	-0.133617	1.05639	0.495 (48)
AP20	0.671947	0.499829	0.661748	1.06736	0.438 (20)
AP21	1.14123	0.833237	-2.27178	2.67538	0.829 (25)
AP19	-0.0384754	-1.36866	-2.36563	2.7333	0.771 (46)
AP26 EXRIO	-0.34408	0.331127	0.240302	0.534585	0.412 (36)
AP27	0.0698572	-0.483048	-0.377446	0.616994	0.316 (29)
AP28	-0.16221	-0.0860238	0.147494	0.235514	0.251 (20)
AP29	0.886318	1.3093	0.181062	1.59141	0.381 (24)
AP30	-0.778223	-1.49334	-0.400327	1.73088	0.442 (23)
AP31	0.362353	0.137303	-0.00395301	0.387515	0.342 (21)
AP32 EXRIO	-0.118686	0.104973	0.237287	0.285326	0.261 (52)
AP33	-0.171337	0.00433837	-0.07081	0.185443	0.399 (27)
AP35	-0.0940049	-0.122303	-0.0193351	0.155463	0.212 (12)
AP36	-0.0650473	-0.0623375	0.257757	0.273049	0.476 (80)
AP37	-0.513711	0.429403	0.638463	0.925159	0.382 (52)
AP38	0.134883	0.555146	-0.198545	0.604814	0.341 (27)
AP25	0.783051	-0.340626	-0.472433	0.975903	0.372 (13)

Label	X error (cm)	Y error (cm)	Z error (cm)	Total (cm)	Image (pix)
AP24	-0.515669	0.0659779	0.0684122	0.524355	0.287 (14)
AP23	0.0960818	0.209138	-0.359204	0.426612	0.541 (12)
AP22	0.0689827	-1.25731	0.122228	1.26512	0.397 (17)
AP17	0.76406	0.193543	0.424449	0.895212	0.427 (35)
AP10	0.110346	0.795816	-1.31992	1.54522	0.413 (42)
AP39	2.05068	0.443627	-0.361684	2.12907	0.512 (37)
AP100	-0.969139	-0.21979	1.33512	1.66436	0.495 (42)
AP101	-2.39857	-0.843559	0.821285	2.67194	0.428 (46)
AP102	-0.0024075	-0.196676	0.0866496	0.214932	0.154 (8)
AP105	1.01808	1.36436	-1.19965	2.08257	0.560 (20)
AP106	-1.34026	-0.278315	0.210007	1.38486	0.450 (11)
AP107	0.790809	-0.850068	-1.21005	1.67697	0.719 (15)
AP108	-0.405781	-0.437064	-0.0948803	0.603892	0.240 (16)
AP109	0.0297724	-0.123151	-0.0131022	0.127375	0.275 (21)
AP110	-0.496192	-0.00587123	-0.092893	0.504847	0.633 (24)
AP103	0.0395986	0.195385	0.0884994	0.218118	0.188 (30)
AP111	1.77094	0.0824875	1.5611	2.36222	0.449 (52)
AP112	0.246751	-0.0129771	-0.0249661	0.24835	0.423 (16)
AP113	0.369407	-0.211917	-0.0376786	0.427539	0.489 (12)
AP114	-0.110418	0.386803	0.715596	0.820906	0.571 (13)
AP115	-0.449038	-0.117496	0.845894	0.964872	0.305 (54)
AP117	0.132438	0.512991	-0.082798	0.536242	0.290 (26)
AP118	-0.0468374	0.0124223	0.015514	0.0508797	0.489 (13)
AP119	-0.301879	-0.158085	-0.268906	0.434088	0.455 (44)
AP120	0.163838	0.383659	0.0607188	0.421573	0.407 (13)
AP120A	-0.0099164	-0.724938	0.331611	0.797245	0.599 (18)
AP121	-0.955813	0.337997	1.91203	2.16418	0.537 (64)
AP122	0.433679	0.354171	0.303662	0.636966	0.263 (42)
AP123	-1.14062	-0.454472	0.393981	1.28949	0.352 (64)
AP124	-0.304868	0.307848	0.264405	0.507567	0.328 (62)
AP125	0.0503279	0.0218252	0.0479063	0.0728303	0.435 (7)
AP126	0.15411	-0.314947	-0.651008	0.739427	0.355 (60)

Label	X error (cm)	Y error (cm)	Z error (cm)	Total (cm)	Image (pix)
AGAB1	-0.0375075	0.0672358	-1.89727	1.89883	0.765 (42)
AGAB2	-1.34048	0.600899	0.358183	1.51204	0.580 (25)
AGAB3	0.443403	-0.140226	-0.0584522	0.468707	0.602 (19)
AGAB4	0.792027	-0.61183	-0.315316	1.04932	6.655 (40)
Total	0.69547	0.675255	0.736945	1.21768	1.025

Table 3. Control points.
X - Easting, Y - Northing, Z - Altitude.

Digital Elevation Model

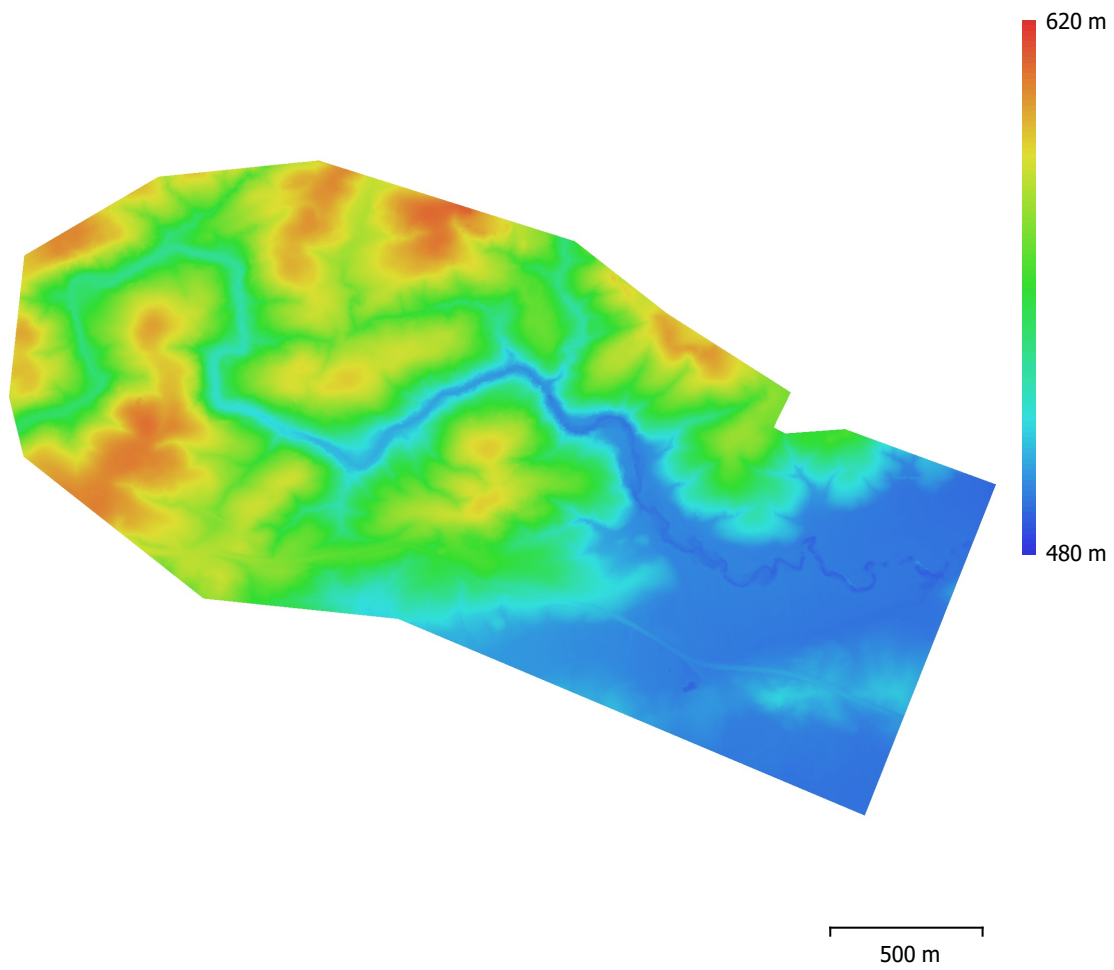


Fig. 4. Reconstructed digital elevation model.

Resolution: 12.9 cm/pix
Point density: 60.2 points/m²

Processing Parameters

General

Cameras	5404
Aligned cameras	5404
Markers	67

Shapes

Point	4
Polygon	5
Coordinate system	WGS 84 + EGM96 height (EPSG::9707)
Coordinate system	SIRGAS 2000 / UTM zone 24S (EPSG::31984)
Rotation angles	Yaw, Pitch, Roll

Point Cloud

Points	4,441,192 of 8,007,418
RMS reprojection error	0.199914 (1.20972 pix)
Max reprojection error	17.8909 (90.7955 pix)
Mean key point size	4.46002 pix
Point colors	3 bands, uint8
Key points	No
Average tie point multiplicity	4.35584

Alignment parameters

Accuracy	High
Generic preselection	Yes
Reference preselection	Source
Key point limit	40,000
Key point limit per Mpx	1,000
Tie point limit	10,000
Exclude stationary tie points	No
Guided image matching	No
Adaptive camera model fitting	No
Matching time	54 minutes 26 seconds
Matching memory usage	2.96 GB
Alignment time	2 hours 31 minutes
Alignment memory usage	3.50 GB

Optimization parameters

Parameters	f, cx, cy, k1-k4, p1, p2
Fit additional corrections	Yes
Adaptive camera model fitting	No
Optimization time	1 hours 13 minutes
Date created	2021:10:22 00:30:44
Software version	1.7.4.12511
File size	657.48 MB

Depth Maps

Count	5370
-------	------

Depth maps generation parameters

Quality	Medium
Filtering mode	Mild
Processing time	2 hours 42 minutes
Memory usage	3.81 GB
Date created	2021:10:24 19:51:41
Software version	1.7.4.12511
File size	10.46 GB

Dense Point Cloud

Points 210,832,146
Point colors 3 bands, uint8

Depth maps generation parameters

Quality Medium
Filtering mode Mild
Processing time 2 hours 42 minutes
Memory usage 3.81 GB

Dense cloud generation parameters

Processing time 4 hours 43 minutes
Memory usage 10.60 GB

Ground points classification parameters

Max angle (°) 5
Max distance (m) 0.2
Cell size (m) 20
Classification time 44 minutes 2 seconds
Classification memory usage 18.95 GB
Date created 2021:10:25 00:35:03
Software version 1.7.4.12511
File size 6.56 GB

Model

Faces 13,934,521
Vertices 6,976,126
Vertex colors 3 bands, uint8

Depth maps generation parameters

Quality Medium
Filtering mode Mild
Processing time 2 hours 42 minutes
Memory usage 3.81 GB

Reconstruction parameters

Surface type Height field
Source data Dense cloud
Interpolation Enabled
Strict volumetric masks No
Processing time 25 minutes 7 seconds
Memory usage 5.22 GB
Date created 2021:10:25 13:43:21
Software version 1.7.4.12511
File size 272.55 MB

DEM

Size 37,182 x 25,416
Coordinate system SIRGAS 2000 / UTM zone 24S (EPSG::31984)

Reconstruction parameters

Source data Dense cloud
Interpolation Enabled
Processing time 42 minutes 23 seconds
Memory usage 314.50 MB
Date created 2021:10:25 14:59:50
Software version 1.7.4.12511
File size 1.01 GB

Orthomosaic

Size 104,395 x 69,691
Coordinate system SIRGAS 2000 / UTM zone 24S (EPSG::31984)
Colors 3 bands, uint8

Reconstruction parameters

Blending mode Mosaic

Surface	DEM
Enable hole filling	Yes
Enable ghosting filter	No
Processing time	9 hours 28 minutes
Memory usage	5.36 GB
Date created	2021:10:25 23:47:05
Software version	1.7.4.12511
File size	124.67 GB

System

Software name	Agisoft Metashape Professional
Software version	1.7.4 build 12511
OS	Windows 64 bit
RAM	63.95 GB
CPU	Intel(R) Core(TM) i7-8700K CPU @ 3.70GHz
GPU(s)	NVIDIA GeForce GTX 1080 Ti



1.8 – Arquivo com Levantamento com RTK

Barragem Beré - Serviços Cartográficos - Apoio de Campo					Pontos Levantamento Topográfico RTK				
ID	Coordenadas		Cota	Descrição	ID	Coordenadas		Cota	Descrição
	X	Y				X	Y		
1	480.706,179	9.153.261,780	496,750	M1	63	480.434,373	9.153.911,045	499,192	TN EX2
2	480.827,313	9.153.065,949	499,010	B01	64	480.614,363	9.153.924,628	497,026	TN EX2A
3	480.654,322	9.153.463,244	511,481	M2	65	480.620,179	9.153.929,701	503,999	TN EX2A
4	480.412,715	9.154.072,043	539,670	B02	66	480.620,183	9.153.929,708	503,986	TN EX2A
5	480.643,578	9.153.643,111	497,674	M3 AP	67	480.614,331	9.153.924,630	497,008	TN EX2A
6	480.638,635	9.153.678,835	493,254	EX RIO	68	480.596,241	9.153.906,618	496,239	TN EX2A
7	480.624,808	9.153.714,420	493,521	EX RIO	69	480.584,548	9.153.896,270	499,085	TN EX2A
8	480.619,000	9.153.742,451	494,914	EX E3	70	480.565,837	9.153.877,107	499,357	TN EX2A
9	480.641,671	9.153.747,710	493,714	EX E3RIO	71	480.555,614	9.153.866,227	504,716	TN EX2A
10	480.630,141	9.153.776,490	493,414	EX RIO	72	480.543,343	9.153.852,083	512,441	TN EX2A
11	480.633,402	9.153.811,393	495,099	MARCO	73	480.528,108	9.153.836,117	519,921	TN EX2A
12	480.626,288	9.153.836,768	493,762	EX RIO	74	480.516,815	9.153.820,925	527,307	TN EX2A
13	480.612,841	9.153.885,935	494,332	EX RIO	75	480.503,691	9.153.806,083	535,528	TN EX2A
14	480.606,520	9.153.921,276	494,304	EX 2A	76	480.495,855	9.153.798,864	540,027	TN EX2A
15	480.581,158	9.153.956,790	494,357	EXRIO	77	480.495,837	9.153.798,882	539,996	TN EX2A
16	480.540,581	9.153.967,012	494,562	EXRIO	78	480.503,676	9.153.806,086	535,516	TN EX2A
17	480.518,585	9.153.965,295	494,790	EXRIO	79	480.516,796	9.153.820,957	527,294	TN EX2A
18	480.488,750	9.153.936,927	494,829	EXRIO	80	480.528,132	9.153.836,112	519,896	TN EX2A
19	480.454,113	9.153.920,301	495,402	EXRIO CE	81	480.543,391	9.153.852,081	512,447	TN EX2A
20	480.433,871	9.153.918,627	495,377	EXRIO EX2	82	480.633,382	9.153.811,401	495,215	AP06
21	480.410,540	9.153.922,951	495,480	EX	83	480.633,388	9.153.811,390	495,218	AP06
22	480.389,171	9.153.942,173	495,952	EXRIO	84	480.626,254	9.153.836,828	493,789	AP07
23	480.377,524	9.153.968,970	496,571	EXRIO	85	480.596,231	9.153.906,644	496,266	TNEX2A
24	480.341,291	9.154.027,509	495,681	EXRIO EX1	86	480.659,431	9.153.751,093	497,572	TNEX3
25	480.279,012	9.154.107,622	499,160	EX M1	87	480.677,426	9.153.760,880	498,042	TNEX3
26	480.286,200	9.154.114,118	500,747	TN M1	88	480.695,208	9.153.770,874	502,835	TNEX3
27	480.290,561	9.154.120,072	504,891	TN	89	480.712,221	9.153.779,730	509,384	TNEX3
28	480.269,632	9.154.095,387	503,831	TN	90	480.730,007	9.153.788,183	515,590	TNEX3
29	480.342,748	9.154.046,062	500,079	PAREDE	91	480.740,770	9.153.793,506	519,451	TNEX3 MARCO
30	480.341,430	9.154.045,400	500,243	PAREDE	92	480.748,729	9.153.794,718	521,955	TNEX3
31	480.341,832	9.154.044,461	500,294	PAREDE	93	480.766,386	9.153.803,759	527,613	TNEX3
32	480.341,332	9.154.045,438	499,955	SANGRADOR	94	480.785,656	9.153.810,946	533,984	TNEX3
33	480.341,717	9.154.044,531	499,952	SANGRADOR	95	480.804,157	9.153.818,297	539,129	TNEX3
34	480.330,864	9.154.040,102	499,925	SANGRADOR	96	480.804,158	9.153.818,297	539,114	TNEX3
35	480.331,175	9.154.039,369	499,852	SANGRADOR	97	480.785,653	9.153.810,971	533,965	TNEX3
36	480.330,633	9.154.040,131	500,187	PAREDE	98	480.766,403	9.153.803,745	527,609	TNEX3
37	480.408,449	9.154.069,744	538,611	TN	99	480.748,721	9.153.794,721	522,001	TNEX3
38	480.395,939	9.154.060,765	531,468	TN EX1	100	480.740,772	9.153.793,547	519,462	TNEX3
39	480.380,255	9.154.050,803	524,330	TN EX1	101	480.730,014	9.153.788,204	515,598	TNEX3
40	480.362,321	9.154.047,263	512,341	TN EX1	102	480.712,200	9.153.779,758	509,390	TNEX3
41	480.350,006	9.154.035,567	501,991	TN EX1	103	480.695,217	9.153.770,879	502,844	TNEX3
42	480.350,009	9.154.035,562	501,981	TN EX1	104	480.677,426	9.153.760,878	498,045	TNEX3
43	480.362,319	9.154.047,250	512,356	TN EX1	105	480.659,419	9.153.751,084	497,595	TNEX3
44	480.380,467	9.154.050,686	524,357	TN EX1	106	480.647,104	9.153.745,256	497,697	TNEX3
45	480.395,977	9.154.060,721	531,452	TN EX1	107	480.638,573	9.153.678,872	493,314	EX RIO
46	480.409,066	9.154.069,911	538,721	TN EX1	108	480.010,803	9.153.609,459	569,882	TN
47	480.434,256	9.153.911,062	499,219	TN EX2	109	480.827,313	9.153.065,949	499,010	B01
48	480.434,274	9.153.911,058	499,212	TN EX2	110	480.751,176	9.153.533,363	496,876	TN
49	480.435,043	9.153.926,085	495,889	TN EX2	111	480.164,688	9.153.703,393	587,384	B03
50	480.432,680	9.153.946,967	499,769	TN EX2	112	480.164,697	9.153.703,417	587,383	B03
51	480.435,933	9.153.969,281	504,804	TN EX2	113	480.754,291	9.153.547,551	492,771	EXRIO
52	480.436,689	9.153.982,815	512,617	TN EX2	114	480.761,094	9.153.562,427	496,546	TN
53	480.437,933	9.153.999,500	525,236	TN EX2	115	480.757,517	9.153.656,333	497,743	TN
54	480.438,423	9.154.018,899	536,883	TN EX2	116	480.751,983	9.153.704,863	505,805	TN
55	480.439,148	9.154.037,942	545,195	TN EX2	117	480.744,539	9.153.736,257	501,714	TN
56	480.439,130	9.154.037,924	545,230	TN EX2	118	480.740,817	9.153.793,557	519,499	AP01

Barragem Beré - Serviços Cartográficos - Apoio de Campo					Pontos Levantamento Topográfico RTK				
ID	Coordenadas		Cota	Descrição	ID	Coordenadas		Cota	Descrição
	X	Y				X	Y		
57	480.438,451	9.154.018,877	536,847	TN EX2	119	480.767,200	9.153.847,633	530,467	TN
58	480.437,973	9.153.999,539	525,193	TN EX2	120	480.790,673	9.153.860,033	534,331	TN
59	480.436,635	9.153.982,805	512,651	TN EX2	121	480.790,698	9.153.860,032	534,340	TN
60	480.435,910	9.153.969,364	504,863	TN EX2	122	480.767,209	9.153.847,663	530,444	TN
61	480.194,049	9.154.418,645	571,126	TN	123	480.740,814	9.153.793,535	519,510	AP01
62	480.435,077	9.153.926,124	495,809	TN EX2	124	480.744,582	9.153.736,247	501,701	TN
125	480.647,106	9.153.745,276	497,697	TNEX3	187	479.899,543	9.153.955,016	503,927	TN
126	480.624,796	9.153.714,412	493,488	EX RIO	188	479.898,043	9.153.959,248	502,642	EXRIO
127	480.641,667	9.153.747,734	493,745	EX E3RIO	189	479.897,405	9.153.963,328	503,856	TN
128	480.630,128	9.153.776,476	493,489	EX RIO	190	479.890,674	9.153.982,995	510,416	TN
129	480.626,273	9.153.836,779	493,811	EX RIO	191	479.890,757	9.153.982,977	510,344	TN
130	480.612,843	9.153.885,983	494,350	EX RIO	192	479.864,599	9.153.941,196	503,402	EXRIO
131	480.606,598	9.153.921,213	494,523	EX 2ARIO	193	479.822,657	9.153.925,384	504,336	EXRIO
132	480.272,818	9.154.099,393	501,239	TN	194	479.825,851	9.153.916,589	505,524	TN
133	480.269,355	9.154.095,659	503,701	TN	195	479.835,546	9.153.903,412	508,329	TN
134	480.242,329	9.154.127,199	499,485	EXRIO	196	479.835,535	9.153.903,395	508,337	TN
135	480.240,595	9.154.115,804	501,727	TN	197	479.825,867	9.153.916,644	505,422	TN
136	480.237,423	9.154.098,687	511,010	TN	198	479.822,660	9.153.925,448	504,319	EXRIO
137	480.237,411	9.154.098,687	510,985	TN	199	479.820,989	9.153.934,847	507,512	TN
138	480.238,422	9.154.105,980	507,331	TN	200	479.820,683	9.153.935,118	507,312	TN
139	480.238,430	9.154.105,989	507,326	TN	201	479.789,534	9.153.882,420	505,098	EXRIO AP
140	480.240,438	9.154.115,725	501,746	TN	202	479.781,232	9.153.890,875	506,239	TN
141	480.237,857	9.154.138,326	502,212	TN	203	479.775,205	9.153.898,115	508,990	TN
142	480.235,164	9.154.146,360	506,450	TN	204	479.775,193	9.153.898,094	508,999	TN
143	480.235,178	9.154.146,345	506,460	TN	205	479.781,240	9.153.890,892	506,229	TN
144	480.237,996	9.154.138,374	502,203	TN	206	479.789,496	9.153.882,397	505,072	EXRIO AP
145	480.160,504	9.154.102,088	500,140	EX RIO	207	479.799,462	9.153.876,162	505,966	TN
146	480.157,346	9.154.107,828	500,835	TN	208	479.805,221	9.153.872,652	508,014	TN
147	480.153,438	9.154.119,757	505,672	TN	209	479.805,215	9.153.872,682	508,025	TN
148	480.153,439	9.154.119,727	505,719	TN	210	479.765,293	9.153.839,298	504,934	EXRIO
149	480.157,359	9.154.107,820	500,887	TN	211	479.756,421	9.153.842,215	505,795	TN
150	480.163,215	9.154.094,470	501,456	TN	212	479.744,104	9.153.847,612	508,203	TN
151	480.163,731	9.154.084,406	505,776	TN	213	479.736,708	9.153.851,215	509,134	TN
152	480.163,750	9.154.084,397	505,767	TN	214	479.736,711	9.153.851,224	509,120	TN
153	480.163,469	9.154.094,547	501,448	TN	215	479.743,975	9.153.847,579	508,181	TN
154	480.751,971	9.153.704,835	505,790	TN	216	479.756,433	9.153.842,223	505,766	TN
155	480.117,638	9.154.086,177	501,023	EXRIO	217	479.765,234	9.153.839,329	504,885	EXRIO
156	480.065,641	9.154.062,843	501,878	EXRIO	218	479.770,734	9.153.836,272	506,702	TN
157	480.063,267	9.154.067,927	502,461	TN	219	479.782,679	9.153.829,138	510,230	TN
158	480.058,879	9.154.077,441	507,063	TN	220	479.782,741	9.153.829,074	510,241	TN
159	480.058,881	9.154.077,453	507,042	TN	221	479.770,759	9.153.836,271	506,695	TN
160	480.063,213	9.154.067,931	502,456	TN	222	479.712,484	9.153.803,861	506,311	EXRIO AP
161	480.072,109	9.154.047,768	505,612	TN	223	479.711,882	9.153.789,202	509,439	TN
162	480.072,117	9.154.047,773	505,629	TN	224	479.711,880	9.153.789,176	509,455	TN
163	480.065,609	9.154.062,827	501,852	EXRIO	225	479.712,509	9.153.794,389	508,152	TN
164	479.992,640	9.154.044,520	502,133	EXRIO	226	479.712,548	9.153.794,368	508,158	TN
165	479.991,931	9.154.050,970	506,226	TN	227	479.712,601	9.153.803,881	506,383	EXRIO AP
166	479.992,021	9.154.050,980	503,759	TN	228	479.715,029	9.153.810,651	506,318	TN
167	479.992,134	9.154.056,528	507,199	TN	229	479.714,966	9.153.810,689	506,366	TN
168	479.992,159	9.154.056,561	507,209	TN	230	479.686,544	9.153.825,676	506,559	EXRIO
169	479.992,623	9.154.044,517	502,101	EXRIO	231	479.684,149	9.153.835,572	507,286	TN
170	480.002,519	9.154.031,418	507,425	TN	232	479.687,668	9.153.845,953	509,648	TN
171	480.007,200	9.154.027,228	510,307	TN	233	479.692,723	9.153.861,691	513,910	TN
172	480.007,211	9.154.027,237	510,298	TN	234	479.692,716	9.153.861,698	513,908	TN
173	480.002,501	9.154.031,428	507,452	TN	235	479.687,649	9.153.845,973	509,644	TN
174	479.952,272	9.154.006,442	503,011	EXRIO	236	479.684,138	9.153.835,605	507,290	TN
175	479.952,272	9.154.006,441	503,007	EXRIO	237	479.686,604	9.153.825,882	506,512	EXRIO
176	479.906,635	9.153.962,858	502,711	EXRIO AP	238	479.679,218	9.153.819,577	506,875	TN
177	479.897,993	9.153.959,437	502,781	EXRIO AP	239	479.679,286	9.153.819,554	506,958	TN
178	479.899,783	9.153.955,044	503,943	TN	240	479.675,212	9.153.804,848	509,353	TN
179	479.901,216	9.153.949,633	504,665	TN	241	479.671,472	9.153.792,057	512,601	TN
180	479.901,210	9.153.949,626	504,649	TN	242	479.671,447	9.153.792,031	512,620	TN

Barragem Beré - Serviços Cartográficos - Apoio de Campo					Pontos Levantamento Topográfico RTK				
ID	Coordenadas		Cota	Descrição	ID	Coordenadas		Cota	Descrição
	X	Y				X	Y		
181	479.904,912	9.153.944,567	507,370	TN	243	479.675,179	9.153.804,823	509,398	TN
182	479.907,486	9.153.940,052	510,084	TN	244	479.643,803	9.153.838,906	507,472	TN
183	479.910,506	9.153.934,509	512,246	TN	245	479.643,844	9.153.838,861	507,507	TN
184	479.910,518	9.153.934,519	512,240	TN	246	479.647,097	9.153.848,716	506,960	EXRIO
185	479.907,754	9.153.939,713	510,063	TN	247	479.647,040	9.153.848,760	506,973	EXRIO
186	479.904,906	9.153.944,535	507,355	TN	248	479.655,271	9.153.856,121	507,494	TN
249	479.655,269	9.153.856,137	507,542	TN	311	480.378,278	9.153.742,329	562,683	TNEX3
250	479.588,413	9.153.882,840	506,655	TN	312	480.357,616	9.153.744,066	563,687	TNEX3
251	479.588,425	9.153.882,821	506,662	TN	313	480.336,895	9.153.749,628	565,546	TNEX3
252	479.590,032	9.153.889,264	507,280	TN	314	480.316,958	9.153.753,714	567,789	MARCO AP
253	479.590,127	9.153.889,328	507,311	TN	315	480.164,695	9.153.703,387	587,387	MARCO AP
254	479.587,584	9.153.876,946	507,659	TN	316	480.334,166	9.153.765,117	565,453	TNEX2
255	479.587,607	9.153.876,941	507,663	TN	317	480.352,418	9.153.775,884	562,093	TNEX2
256	479.864,560	9.153.941,202	503,453	EXRIO	318	480.369,336	9.153.786,727	557,592	TNEX2
257	479.951,995	9.154.007,126	502,914	EXRIO	319	480.387,024	9.153.796,922	554,289	TNEX2
258	480.160,485	9.154.102,094	500,213	EXRIO	320	480.390,385	9.153.816,880	550,177	TNEX2
259	480.242,330	9.154.127,188	499,545	EXRIO	321	480.395,015	9.153.836,858	542,844	TNEX2
260	480.336,484	9.154.026,006	498,146	TNEX1	322	480.400,291	9.153.855,542	535,918	TNEX2
261	480.336,464	9.154.025,939	498,080	TNEX1	323	480.408,959	9.153.875,142	526,931	TNEX2
262	480.321,624	9.154.015,639	508,000	TNEX1	324	480.417,756	9.153.892,716	518,238	TNEX2
263	480.321,631	9.154.015,612	507,974	TNEX1	325	480.417,742	9.153.892,720	518,257	TNEX2
264	480.308,221	9.154.006,659	520,155	TNEX1	326	480.408,993	9.153.875,157	526,972	TNEX2
265	480.308,195	9.154.006,614	520,175	TNEX1	327	480.400,291	9.153.855,549	535,916	TNEX2
266	480.296,976	9.153.995,778	532,724	TNEX1	328	480.395,023	9.153.836,840	542,830	TNEX2
267	480.296,972	9.153.995,785	532,724	TNEX1	329	480.390,380	9.153.816,875	550,192	TNEX2
268	480.290,349	9.153.989,360	538,812	TNEX1	330	480.387,041	9.153.796,916	554,267	TNEX2
269	480.290,334	9.153.989,349	538,805	TNEX1	331	480.369,341	9.153.786,738	557,549	TNEX2
270	480.277,507	9.153.975,658	549,953	TNEX1	332	480.352,441	9.153.775,893	562,060	TNEX2
271	480.277,507	9.153.975,634	549,957	TNEX1	333	480.334,171	9.153.765,118	565,450	TNEX2
272	480.263,463	9.153.963,592	559,094	TNEX1	334	480.316,906	9.153.753,738	567,774	MARCO AP
273	480.263,476	9.153.963,601	559,118	TNEX1	335	480.336,849	9.153.749,635	565,557	TNEX3
274	480.251,681	9.153.948,618	568,085	TNEX1	336	480.357,600	9.153.744,089	563,694	TNEX3
275	480.251,685	9.153.948,613	568,080	TNEX1	337	480.378,272	9.153.742,357	562,686	TNEX3
276	480.249,936	9.153.941,032	570,144	TNEX1	338	480.399,630	9.153.741,355	560,912	TNEX3
277	480.249,961	9.153.941,034	570,137	TNEX1	339	480.420,110	9.153.739,499	559,073	TNEX3
278	480.240,449	9.153.931,578	573,714	TNEX1	340	480.441,305	9.153.738,218	556,148	TNEX3
279	480.240,455	9.153.931,575	573,713	TNEX1	341	480.461,568	9.153.735,542	552,055	TNEX3
280	480.225,280	9.153.917,715	576,549	EX1 MARCO AP	342	480.482,567	9.153.732,657	548,242	TNEX3
281	480.225,295	9.153.917,722	576,546	EX1	343	480.502,743	9.153.731,819	543,728	TNEX3
282	480.278,990	9.154.107,518	499,199	EXRIO	344	480.523,125	9.153.733,109	536,271	TNEX3
283	480.272,719	9.154.099,441	501,353	TN	345	480.541,460	9.153.737,019	527,050	TNEX3
284	480.341,272	9.154.027,540	495,708	EXRIO EX1	346	480.562,780	9.153.741,959	518,326	TNEX3
285	480.377,558	9.153.968,972	496,619	EXRIO	347	480.573,985	9.153.739,834	511,564	TNEX3
286	480.389,192	9.153.942,197	496,099	EXRIO	348	480.596,221	9.153.742,504	499,224	TNEX3
287	480.529,774	9.153.347,545	509,519	MARCO AP	349	480.619,024	9.153.742,505	494,934	TNEX3
288	480.532,918	9.153.411,094	515,732	MARCO AP	350	480.488,773	9.153.936,969	494,921	EXRIO
289	480.624,234	9.153.627,973	498,492	EX SANGR	351	480.454,098	9.153.920,328	495,474	EXRIO CE
290	480.624,253	9.153.627,989	498,482	EX	352	480.433,852	9.153.918,585	495,469	EXRIO EX2
291	480.631,772	9.153.642,549	497,908	EX SANGR	353	480.410,605	9.153.922,946	495,523	EXRIO
292	480.631,764	9.153.642,532	497,921	EX	354	480.518,645	9.153.965,410	494,681	EXRIO
293	480.636,918	9.153.662,687	497,228	EX SANGR	355	480.540,608	9.153.967,047	494,646	EXRIO
294	480.636,953	9.153.662,650	497,220	EX	356	480.581,156	9.153.956,802	494,349	EXRIO
295	480.608,210	9.153.613,788	499,153	EX SANGR	357	480.577,546	9.153.591,606	500,551	EX SANGR
296	480.608,218	9.153.613,784	499,171	EX	358	480.562,993	9.153.585,124	501,366	EX SANGR
297	480.593,591	9.153.605,438	499,835	EX SANGR	359	480.541,766	9.153.584,450	502,401	EX SANGR
298	480.593,605	9.153.605,438	499,847	EX SANGR	360	480.528,348	9.153.592,894	502,962	EX SANGR
299	480.923,718	9.153.600,374	509,911	MARCO AP	361	480.509,796	9.153.602,703	504,070	EX SANGR
300	480.596,259	9.153.742,459	499,215	TNEX3	362	480.495,866	9.153.608,167	504,449	EX SANGR
301	480.573,998	9.153.739,814	511,486	TNEX3	363	480.509,755	9.153.602,730	504,051	EX SANGR
302	480.562,808	9.153.741,942	518,353	TNEX3	364	480.528,382	9.153.592,901	502,957	EX SANGR
303	480.541,475	9.153.737,011	527,021	TNEX3	365	480.541,828	9.153.584,432	502,401	EX SANGR
304	480.523,110	9.153.733,091	536,258	TNEX3	366	480.563,004	9.153.585,182	501,370	EX SANGR

Barragem Beré - Serviços Cartográficos - Apoio de Campo					Pontos Levantamento Topográfico RTK				
ID	Coordenadas		Cota	Descrição	ID	Coordenadas		Cota	Descrição
	X	Y				X	Y		
305	480.502,750	9.153.731,836	543,665	TNEX3	367	480.577,535	9.153.591,621	500,557	EX SANGR
306	480.482,585	9.153.732,652	548,193	TNEX3	368	480.495,853	9.153.608,045	504,656	EX SANGR
307	480.461,555	9.153.735,505	552,015	TNEX3	369	480.472,990	9.153.622,543	505,261	EX SANGR
308	480.441,318	9.153.738,176	556,154	TNEX3	370	480.449,148	9.153.629,626	507,741	EX SANGR
309	480.420,113	9.153.739,499	559,106	TNEX3	371	480.441,910	9.153.628,339	508,643	EX SANGR
310	480.399,634	9.153.741,338	560,932	TNEX3	372	480.473,006	9.153.622,601	505,287	EX SANGR
373	480.449,094	9.153.629,528	507,716	EX SANGR	435	480.633,506	9.154.037,589	550,238	TN
374	480.441,912	9.153.628,422	508,656	EX SANGR	436	480.672,919	9.154.030,184	547,676	TN
375	480.441,910	9.153.628,339	508,643	EX SANGR	437	480.645,978	9.153.960,272	535,119	EX2A TN
376	480.312,896	9.153.507,069	541,781	MARCO AP	438	480.672,036	9.153.924,541	525,869	TN
377	480.757,518	9.153.656,327	497,723	TN	439	480.715,624	9.153.897,262	512,898	TN
378	480.761,066	9.153.562,402	496,559	TN	440	480.691,155	9.153.869,540	503,373	TN
379	480.754,273	9.153.547,531	492,764	EXRIO	441	480.674,886	9.153.840,758	498,618	TN
380	480.751,186	9.153.533,365	496,859	TN	442	480.626,267	9.153.836,814	493,809	AP07
381	480.674,904	9.153.840,753	498,619	TNS2	443	480.606,505	9.153.921,293	494,370	AP08
382	480.691,171	9.153.869,550	503,350	TN	444	480.606,470	9.153.921,290	494,389	AP08
383	480.715,603	9.153.897,203	512,904	TN	445	480.537,058	9.153.951,300	496,237	TN
384	480.752,809	9.153.906,447	512,250	TN	446	480.537,044	9.153.951,317	496,238	TN
385	480.752,811	9.153.906,444	512,208	TN	447	480.510,355	9.153.922,473	501,492	TN
386	480.740,489	9.153.891,306	509,263	TN	448	480.490,494	9.153.909,991	506,082	TN
387	480.740,497	9.153.891,306	509,256	TN	449	480.458,585	9.153.883,467	516,486	TN
388	480.672,064	9.153.924,543	525,902	TN	450	480.448,372	9.153.869,691	520,907	TN
389	480.645,967	9.153.960,279	535,114	EX2A TN	451	480.452,567	9.153.835,059	532,337	TN
390	480.705,731	9.154.008,278	556,891	TN	452	480.452,568	9.153.835,054	532,343	TN
391	480.705,732	9.154.008,283	556,874	TN	453	480.448,364	9.153.869,715	520,902	TN
392	480.690,000	9.154.000,488	553,369	AP02	454	480.458,620	9.153.883,468	516,504	TN
393	480.690,001	9.154.000,491	553,359	AP02	455	480.490,487	9.153.909,994	506,079	TN
394	480.672,930	9.154.030,160	547,718	TN	456	480.510,398	9.153.922,487	501,480	TN
395	480.720,327	9.154.053,418	555,944	TN	457	480.643,579	9.153.643,142	497,723	AP09
396	480.720,274	9.154.053,384	555,969	TN	458	480.643,570	9.153.643,143	497,725	AP09
397	480.633,496	9.154.037,581	550,268	TN	459	480.654,311	9.153.463,259	511,532	AP10
398	480.603,555	9.154.068,071	548,294	TN	460	480.532,879	9.153.411,093	515,760	AP11
399	480.632,583	9.154.114,380	554,963	TN	461	480.532,872	9.153.411,096	515,753	AP11
400	480.632,592	9.154.114,364	554,960	TN	462	480.529,781	9.153.347,555	509,541	AP12
401	480.560,332	9.154.067,229	555,837	TN	463	480.069,768	9.153.523,345	555,045	AP13
402	480.506,509	9.154.065,997	560,240	TN	464	480.069,770	9.153.523,338	555,048	AP13
403	480.484,825	9.154.080,690	563,069	TN	465	479.964,785	9.153.658,627	578,182	AP14
404	480.535,836	9.154.113,270	572,260	TN	466	480.234,029	9.153.715,667	577,668	TN
405	480.535,847	9.154.113,263	572,286	TN	467	480.316,936	9.153.753,733	567,772	AP15
406	480.484,812	9.154.080,699	563,084	TN	468	480.316,945	9.153.753,730	567,783	AP15
407	480.458,668	9.154.062,539	555,335	TN	469	480.234,024	9.153.715,683	577,680	TN
408	480.412,690	9.154.072,056	539,712	AP03 B02	470	480.152,440	9.153.802,416	582,640	TN
409	480.422,026	9.154.102,384	534,920	TN	471	480.124,743	9.153.862,915	588,566	TN
410	480.419,509	9.154.127,330	537,751	TN	472	480.225,263	9.153.917,757	576,584	AP16
411	480.397,013	9.154.194,378	524,573	TN	473	480.240,427	9.153.931,595	573,736	TN
412	480.410,828	9.154.151,543	521,542	TN	474	480.124,732	9.153.862,913	588,553	TN
413	480.410,802	9.154.151,553	521,551	TN	475	480.152,423	9.153.802,398	582,652	TN
414	480.414,182	9.154.241,914	534,418	TN	476	480.096,665	9.153.673,437	587,386	TN
415	480.414,211	9.154.241,895	534,419	TN	477	480.096,673	9.153.673,449	587,372	TN
416	480.392,319	9.154.289,782	541,350	AP04	478	479.964,790	9.153.658,627	578,173	AP14
417	480.322,528	9.154.330,440	561,280	TN	479	480.010,805	9.153.609,439	569,868	TN
418	480.284,452	9.154.371,840	567,178	TN	480	480.069,763	9.153.523,323	555,053	AP13
419	480.194,048	9.154.418,640	571,143	TN	481	480.096,542	9.153.408,278	536,645	AP17
420	480.104,655	9.154.439,045	580,804	AP05	482	479.643,790	9.153.543,390	552,472	TN
421	480.104,649	9.154.439,045	580,822	AP05	483	479.494,412	9.153.512,479	563,094	AP18
422	480.284,436	9.154.371,824	567,176	TN	484	479.551,046	9.153.569,005	559,773	TN
423	480.322,510	9.154.330,441	561,260	TN	485	479.572,045	9.153.542,458	553,122	TN
424	480.392,323	9.154.289,794	543,916	AP04	486	479.660,541	9.153.597,587	532,129	TN
425	480.431,160	9.154.201,818	524,877	TN	487	479.649,362	9.153.680,751	523,290	TN
426	480.431,141	9.154.201,810	524,898	TN	488	479.551,050	9.153.569,001	559,771	TN
427	480.397,047	9.154.194,366	524,530	TN	489	479.572,050	9.153.542,466	553,145	TN
428	480.419,502	9.154.127,312	537,740	TN	490	479.494,407	9.153.512,482	563,110	AP18

Barragem Beré - Serviços Cartográficos - Apoio de Campo					Pontos Levantamento Topográfico RTK				
ID	Coordenadas		Cota	Descrição	ID	Coordenadas		Cota	Descrição
	X	Y				X	Y		
429	480.421,990	9.154.102,378	534,916	TN	491	479.454,047	9.153.509,438	564,862	TN
430	480.412,696	9.154.072,076	539,701	AP03 B02	492	479.430,664	9.153.509,859	559,644	TN
431	480.458,715	9.154.062,534	555,346	TN	493	479.397,962	9.153.513,536	567,577	TN
432	480.506,510	9.154.065,993	560,247	TN	494	479.344,528	9.153.534,565	577,361	TN
433	480.560,362	9.154.067,232	555,879	TN	495	479.357,036	9.153.599,552	571,932	TN
434	480.603,572	9.154.068,050	548,283	TN	496	479.374,119	9.153.667,660	581,484	AP20
497	479.508,056	9.153.785,252	579,462	AP21	559	479.499,686	9.154.533,561	593,778	TN
498	479.508,045	9.153.785,250	579,464	AP21	560	479.607,591	9.154.616,333	595,583	AP30
499	479.374,108	9.153.667,670	581,445	AP20	561	479.555,084	9.154.625,489	599,925	AP29
500	479.357,021	9.153.599,537	571,930	TN	562	479.417,885	9.154.637,983	583,388	AP28
501	479.344,523	9.153.534,563	577,352	TN	563	479.359,029	9.154.644,579	574,175	TN
502	479.397,981	9.153.513,539	567,576	TN	564	479.283,110	9.154.609,946	564,719	TN
503	479.430,645	9.153.509,852	559,648	TN	565	479.224,518	9.154.560,164	558,025	AP27
504	479.454,038	9.153.509,415	564,873	TN	566	479.143,789	9.154.568,899	542,528	TN
505	479.643,787	9.153.543,411	552,474	TN	567	479.100,726	9.154.517,063	531,621	AP26 EXRIO
506	479.660,534	9.153.597,582	532,108	TN	568	479.059,225	9.154.502,227	531,647	EXRIO
507	479.616,620	9.153.673,807	528,269	TN	569	479.157,250	9.154.514,105	530,965	EXRIO
508	479.616,643	9.153.673,853	528,253	TN	570	479.326,496	9.154.441,636	528,772	AP32 EXRIO
509	479.682,484	9.153.763,094	513,021	TN	571	479.248,081	9.153.630,051	566,589	TN
510	479.685,496	9.153.873,294	517,436	TN	572	480.073,476	9.153.725,741	582,654	TN
511	479.672,188	9.153.937,194	543,876	AP19	573	479.955,659	9.153.809,193	555,786	AP33
512	479.672,175	9.153.937,182	543,865	AP19	574	479.922,774	9.153.870,151	530,785	TN
513	479.685,432	9.153.873,262	517,479	TN	575	479.907,543	9.153.920,382	513,533	CE TN
514	479.649,380	9.153.680,748	523,275	TN	576	479.906,675	9.153.962,715	503,037	AP34
515	479.239,619	9.153.539,677	575,536	AP22	577	479.973,355	9.154.088,619	535,732	TN
516	479.271,193	9.153.625,430	569,840	TN	578	479.972,862	9.154.141,281	562,862	TN
517	479.270,518	9.153.619,359	568,498	TN	579	479.978,715	9.154.182,561	576,029	AP35
518	479.273,225	9.153.633,543	567,812	TN	580	480.005,212	9.154.225,796	577,469	TN
519	479.253,807	9.153.645,104	564,418	TN	581	480.086,361	9.154.215,324	561,904	TN
520	479.250,514	9.153.635,789	569,595	EX AÇUDE	582	480.106,730	9.154.217,707	556,364	TN
521	479.248,089	9.153.630,052	566,595	TN	583	480.143,086	9.154.198,115	545,691	TN
522	479.226,306	9.153.642,719	568,744	TN	584	479.059,212	9.154.502,225	531,643	EXRIO
523	479.229,709	9.153.648,644	569,915	TN	585	480.155,280	9.154.207,621	540,420	TN
524	479.238,799	9.153.665,199	565,112	TN	586	480.155,153	9.154.207,553	540,484	TN
525	479.184,196	9.153.780,594	588,094	TN	587	480.171,156	9.154.218,633	530,553	TN
526	479.042,954	9.153.807,730	602,043	AP23	588	480.175,119	9.154.256,236	529,960	TN
527	479.049,029	9.153.872,943	596,626	TN	589	480.174,386	9.154.231,092	527,783	TN
528	479.053,368	9.153.911,879	602,082	TN	590	480.204,400	9.154.188,647	509,481	TN
529	479.073,655	9.154.149,973	589,435	AP24	591	480.219,576	9.154.167,091	505,443	TN
530	479.076,763	9.154.192,411	582,521	TN	592	480.220,198	9.154.139,774	501,079	TN
531	479.082,477	9.154.259,932	592,330	AP25	593	480.242,334	9.154.127,256	499,552	AP36
532	479.169,394	9.154.314,856	580,293	TN	594	480.334,401	9.154.081,653	500,859	TN
533	479.095,574	9.154.420,766	563,590	TN	595	480.377,545	9.153.969,002	496,642	AP37
534	479.100,734	9.154.517,066	531,620	AP26 EXRIO	596	480.363,433	9.154.092,758	506,146	TN
535	479.143,760	9.154.568,885	542,554	TN	597	480.312,913	9.153.507,074	541,808	AP38
536	479.224,509	9.154.560,142	558,043	AP27	598	480.351,116	9.154.086,416	502,587	TN
537	479.283,092	9.154.609,953	564,738	TN	599	480.363,433	9.154.092,758	506,146	TN
538	479.359,011	9.154.644,603	574,174	TN	600	478.165,167	9.154.206,976	563,795	ASF
539	479.417,880	9.154.637,982	583,401	AP28	601	478.214,828	9.154.185,368	555,625	TN
540	479.555,074	9.154.625,474	599,950	AP29	602	478.214,834	9.154.185,408	555,590	TN
541	479.607,603	9.154.616,331	595,577	AP30	603	479.250,492	9.153.635,789	569,597	EX PAR AÇUDE
542	479.499,665	9.154.533,543	593,781	TN	604	479.253,813	9.153.645,069	564,414	TN
543	479.508,712	9.154.472,765	594,406	TN	605	479.326,488	9.154.441,649	528,775	AP32 EXRIO
544	479.562,191	9.154.378,313	584,400	TN	606	479.157,254	9.154.514,110	530,960	EXRIO
545	479.597,432	9.154.338,188	581,993	AP31	607	479.095,582	9.154.420,766	563,587	TN
546	479.672,302	9.154.223,341	564,482	TN	608	479.169,379	9.154.314,840	580,287	TN
547	479.658,110	9.154.226,777	568,135	TN	609	479.082,478	9.154.259,925	592,343	AP25
548	479.638,045	9.154.227,947	562,862	TN	610	479.076,751	9.154.192,383	582,499	AP25
549	479.629,356	9.154.159,499	573,022	TN	611	479.073,667	9.154.149,951	589,430	AP24
550	479.599,955	9.154.061,444	585,607	TN	612	479.053,348	9.153.911,895	602,069	TN
551	479.599,957	9.154.061,439	585,603	TN	613	479.049,018	9.153.872,932	596,616	TN
552	479.629,372	9.154.159,526	573,021	TN	614	479.042,964	9.153.807,708	602,034	AP23

Barragem Beré - Serviços Cartográficos - Apoio de Campo				
ID	Coordenadas		Cota	Descrição
	X	Y		
553	479.672,294	9.154.223,309	564,486	TN
554	479.658,076	9.154.226,793	568,128	TN
555	479.638,066	9.154.227,941	562,847	TN
556	479.597,424	9.154.338,198	581,980	AP31
557	479.562,203	9.154.378,282	584,400	TN
558	479.508,716	9.154.472,776	594,399	TN
621	479.922,765	9.153.870,165	530,805	TN
622	479.907,538	9.153.920,383	513,544	CE TN
623	479.906,650	9.153.962,711	503,024	AP34
624	479.973,375	9.154.088,624	535,737	TN
625	479.972,871	9.154.141,264	562,861	TN
626	479.978,700	9.154.182,567	576,040	AP35
627	480.005,210	9.154.225,794	577,469	TN
628	480.086,336	9.154.215,312	561,895	TN
629	480.106,745	9.154.217,708	556,360	TN
630	480.143,087	9.154.198,118	545,687	TN
631	480.155,162	9.154.207,558	540,474	TN
632	480.175,126	9.154.256,234	529,957	TN
633	480.174,345	9.154.231,064	527,769	TN
634	480.171,164	9.154.218,621	530,543	TN
635	480.204,381	9.154.188,656	509,475	TN
636	480.219,572	9.154.167,075	505,463	TN
637	480.220,191	9.154.139,784	501,101	TN
638	480.242,331	9.154.127,247	499,545	AP36
639	480.351,116	9.154.086,425	502,574	TN
640	480.363,420	9.154.092,755	506,155	TN
641	480.334,399	9.154.081,650	500,860	TN
642	480.377,547	9.153.969,001	496,656	AP37
643	480.312,875	9.153.507,094	541,806	AP38
644	478.227,261	9.154.148,141	551,113	TN
645	478.227,247	9.154.148,155	551,101	TN
646	478.165,168	9.154.206,968	563,793	TN
647	479.273,214	9.153.633,540	567,825	TN
648	479.271,164	9.153.625,441	569,832	TN
649	479.270,501	9.153.619,311	568,497	TN
650	479.239,625	9.153.539,650	575,542	AP22
651	480.096,572	9.153.408,262	536,660	AP17
652	480.529,775	9.153.347,556	509,553	AP12
653	480.654,329	9.153.463,214	511,550	AP10
654	480.923,715	9.153.600,363	509,932	AP39
655	480.923,725	9.153.600,363	509,924	AP39

Pontos Levantamento Topográfico RTK				
ID	Coordenadas		Cota	Descrição
	X	Y		
615	479.184,194	9.153.780,622	588,087	TN
616	479.238,770	9.153.665,176	565,114	TN
617	479.229,708	9.153.648,622	569,909	TN
618	479.226,294	9.153.642,699	568,724	TN
619	479.955,654	9.153.809,185	555,788	AP33
620	480.073,474	9.153.725,741	582,668	TN
Resumo dos Serviços do Aerolevantamento e do Levantamento Topográfico com RTK				
ID	Descrição			Total
01	Área do Voo (ha)			308,70
02	Total do Levantamento RTK (km)			21,255