図 28　Mavago-3 物理探査の位置と解析結果

5-5 Ngauma 郡 Massangulo 郡都

図 29 に Massangulo 郡都での全物理探査位置を示す。

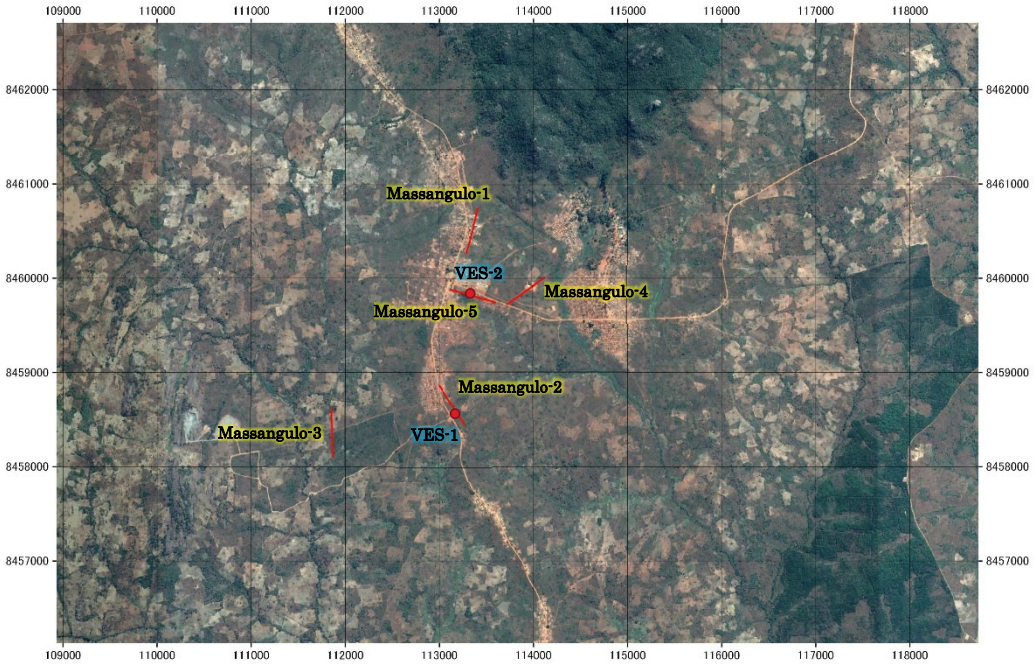


図 29　　Ngauma 郡 Massangulo 郡都での物理探査位置

(1) Massangulo-1

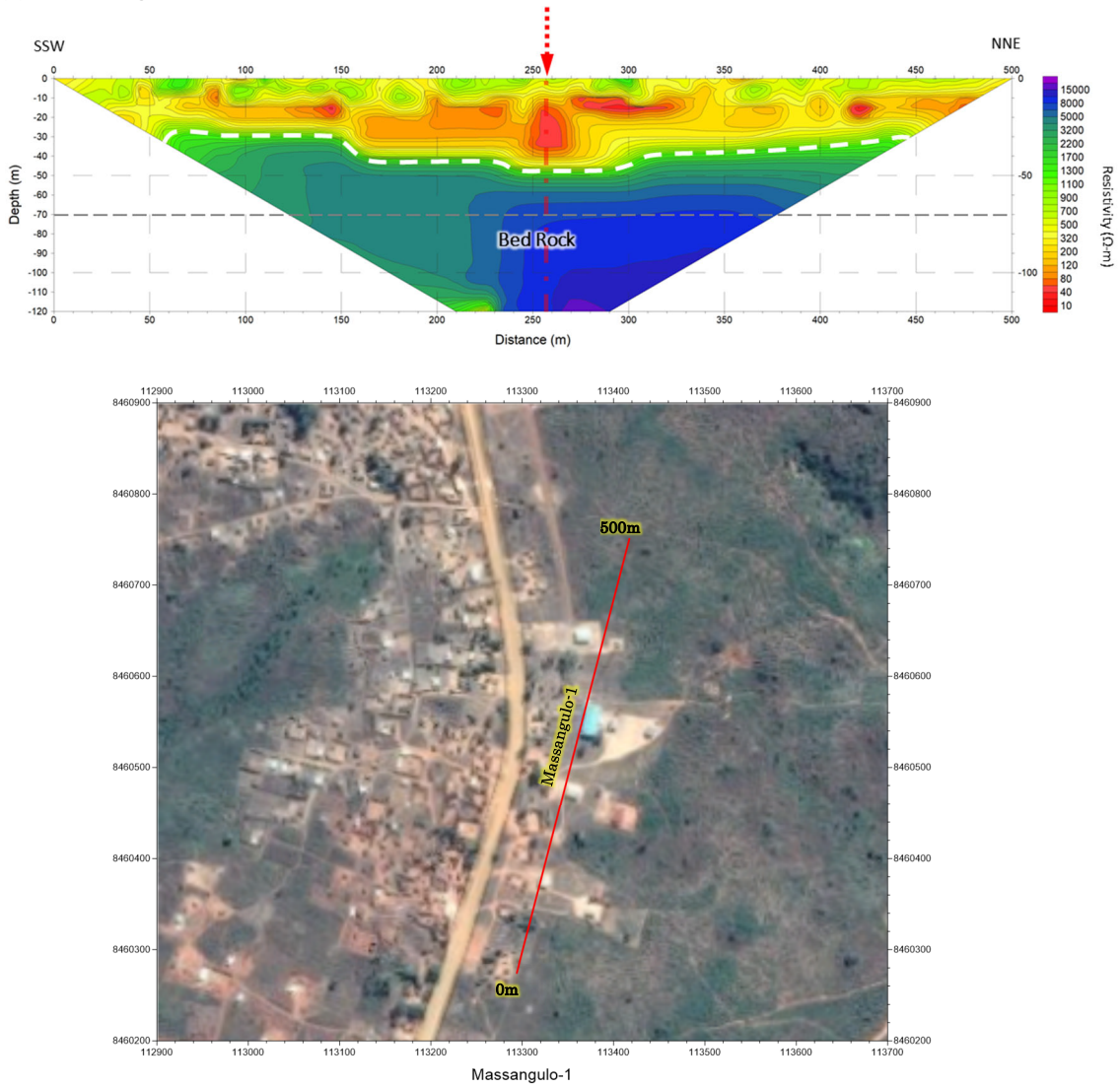


図 30　Massangulo-1 物理探査の位置と解析結果

北側の山麓・主要道路沿いにて NNE-SSW 方向の測線（測線長 500m）で実施した。

全体的に表層に低比抵抗層があり、距離 160m より NNE 側はそれが層厚 40m 前後まで厚くなる。東側には ENE-WSW 方向の山麓線があり、西側には同様の方向を持つ沢状地形があり、低比抵抗層の窪みはこれらと連続する位置に分布するが、断層や破砕帯を示すような構造とはなっていない。低比抵抗層厚の厚い部分ではある程度の地下水開発は可能と思われるが、水量に限りがあるものと考えられる。

(2) Massangulo-2

市街地の南側の主要道路沿いの NNW-SSE 方向の測線（測線長 500m）で実施した。

硬質な塊状岩盤と思われる高比抵抗部は測線中央部に限られ、測線両端では深部まで比抵抗の低下が見られる。図の白い点線で示すような断層が想定されるが、その中の距離 347m

地点において垂直探査を実施して比抵抗分布を確認した。

垂直探査の結果は図 31 に示されるとおりであるが、この解析結果によると、深度 45m 程度まで 2 次元探査の解析結果と同様の比抵抗分布を示すが、以深は数万 Ω-m まで上昇しており、実際の下部基盤は 2 次元探査解析結果より高比抵抗を示すものが分布している可能性がある。

距離 50m 付近及び 450m 付近下部には 100Ω-m 以下の低比抵抗部が深部方向に分布することから、地下水開発ポテンシャルが高い箇所と想定される。

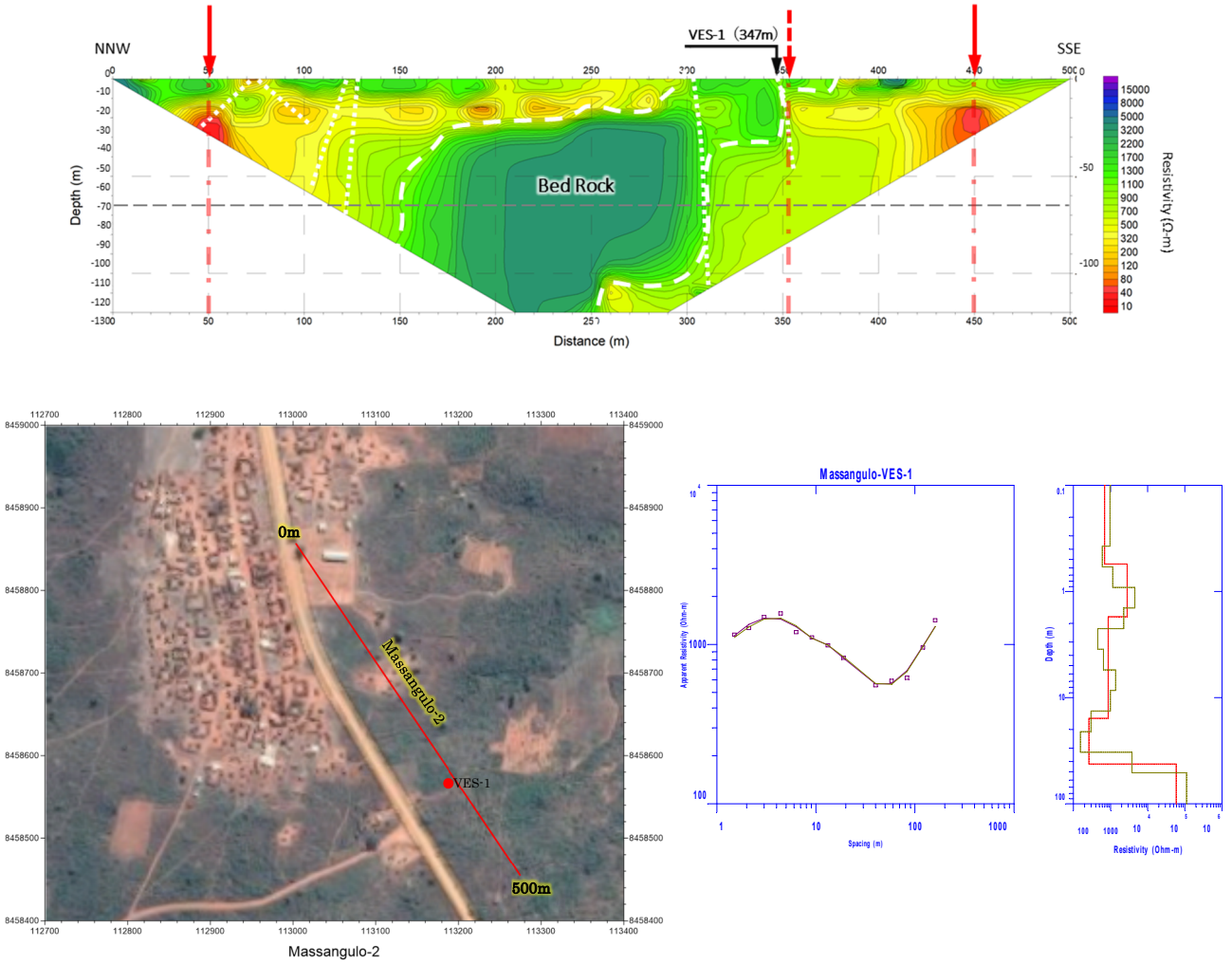


図 31　Massangulo-2 物理探査の位置と解析結果

(3) Massangulo-3

市街地中心から南西方向 1.5～2km の地点で南北方向の測線（測線長 500m）で実施した。

表層の低比抵抗層は全体に薄く、表層風化層～堆積層の薄い地域である。その中にあって距離 90～100m の間及び 220～250m の間は周辺よりも低い比抵抗部が深部方向に続く構造となっており、地質構造帯を形成しているものと推定される。しかし、その比抵抗値が 1000Ω-m 前後と高く、地下水開発ポテンシャルとしてはやや低いものと考えられる。

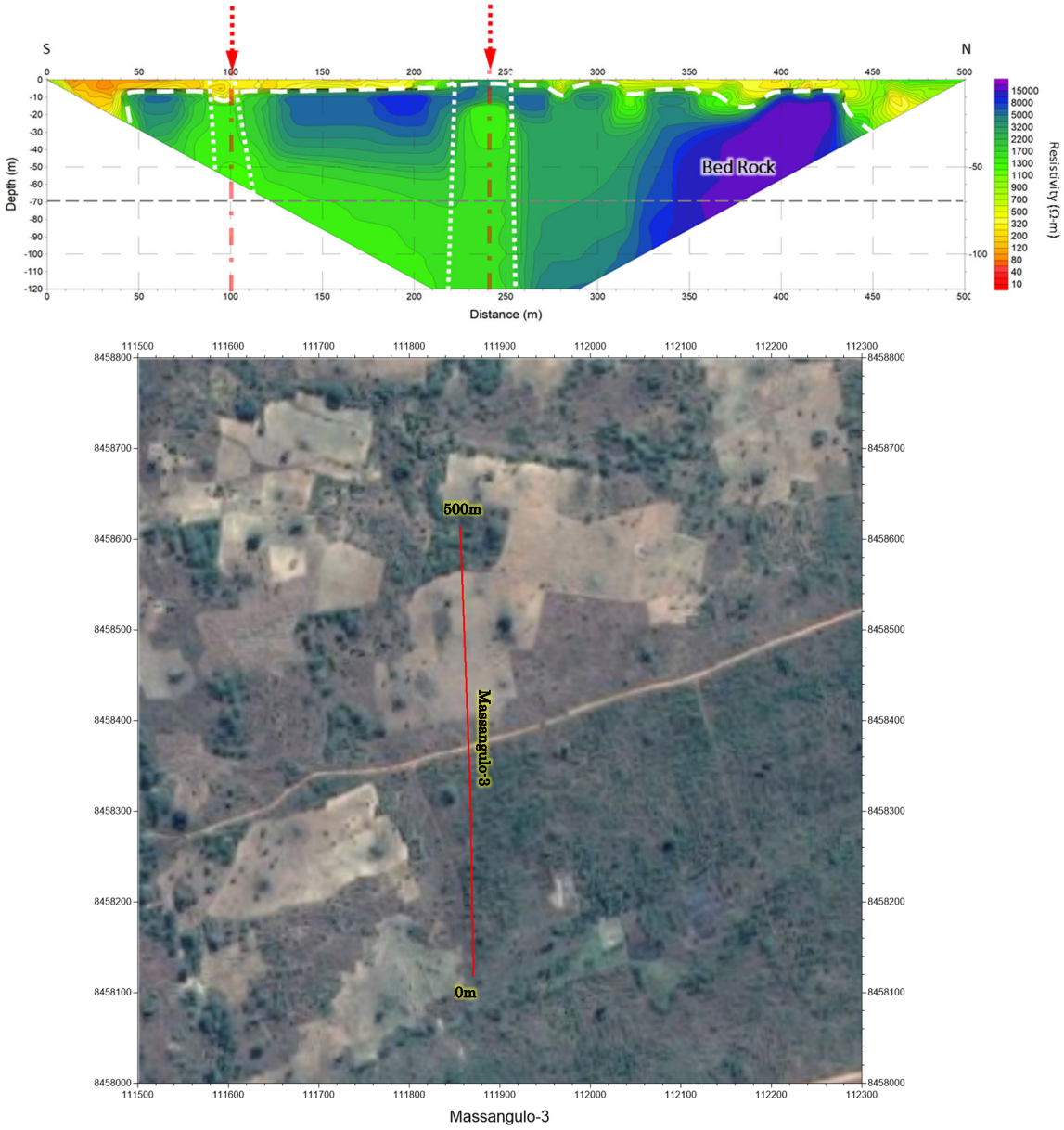


図 32　Massangulo-3 物理探査の位置と解析結果

(4) Massangulo-4

東西の市街地間のほぼ中央にて SW-NE 方向の測線（測線長 500m）で実施した。

距離 30～120m、220～290m、及び 400m から NE 側に深部方向に向かう低比抵抗帯が認め

られ、地質構造帯が分布するものと思われる。しかし、距離 220～290m 間のものは深度 20m 以深の比抵抗値が 500～1000Ω-m と比較的高い値を示し、地下水開発可能性としては不安が残る。また距離 30～120m、400m から NE 側のものはデータの少ない測線の両端側であることから、その確度に乏しい。

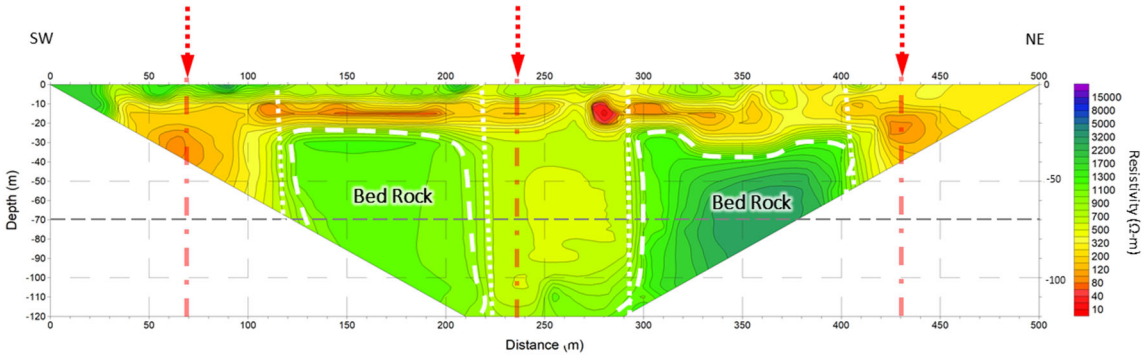


図 33　Massangulo-4 物理探査の位置と解析結果

(5) Massangulo-5

主要道路から東側の市街地に向かう道路沿いにて WNW-ESE 方向の測線（測線長 500m）で実施した。

距離 85m、160m、370m 地点で断層を示唆する構造が認められ、特に 160～370m の間は深部ほど比抵抗が低くなるような解析結果となっていることから破砕帯を形成しているものと思われる。

この間の一部でこの解析結果による垂直方向の比抵抗分布を確認するため、距離 213m の

地点で垂直探査を実施した。垂直探査の結果は図 34 に示されるとおりであるが、この解析結果によると、深度 20m 程度までの表層部は 700～3000Ω-m ほどの比較的高い比抵抗を示すが、以深 55m 程度まで 300Ω-m 程度、更に深いところでも 500Ω-m 程度の比抵抗を示している。2 次元探査解析結果は 50m より以深はさらに低比抵抗となっているが、実際は下部の方が高い可能性がある。いずれにしても全深度に渡って比較的低い比抵抗を示していることにより、地下水開発のポテンシャルは高いものと推測される。

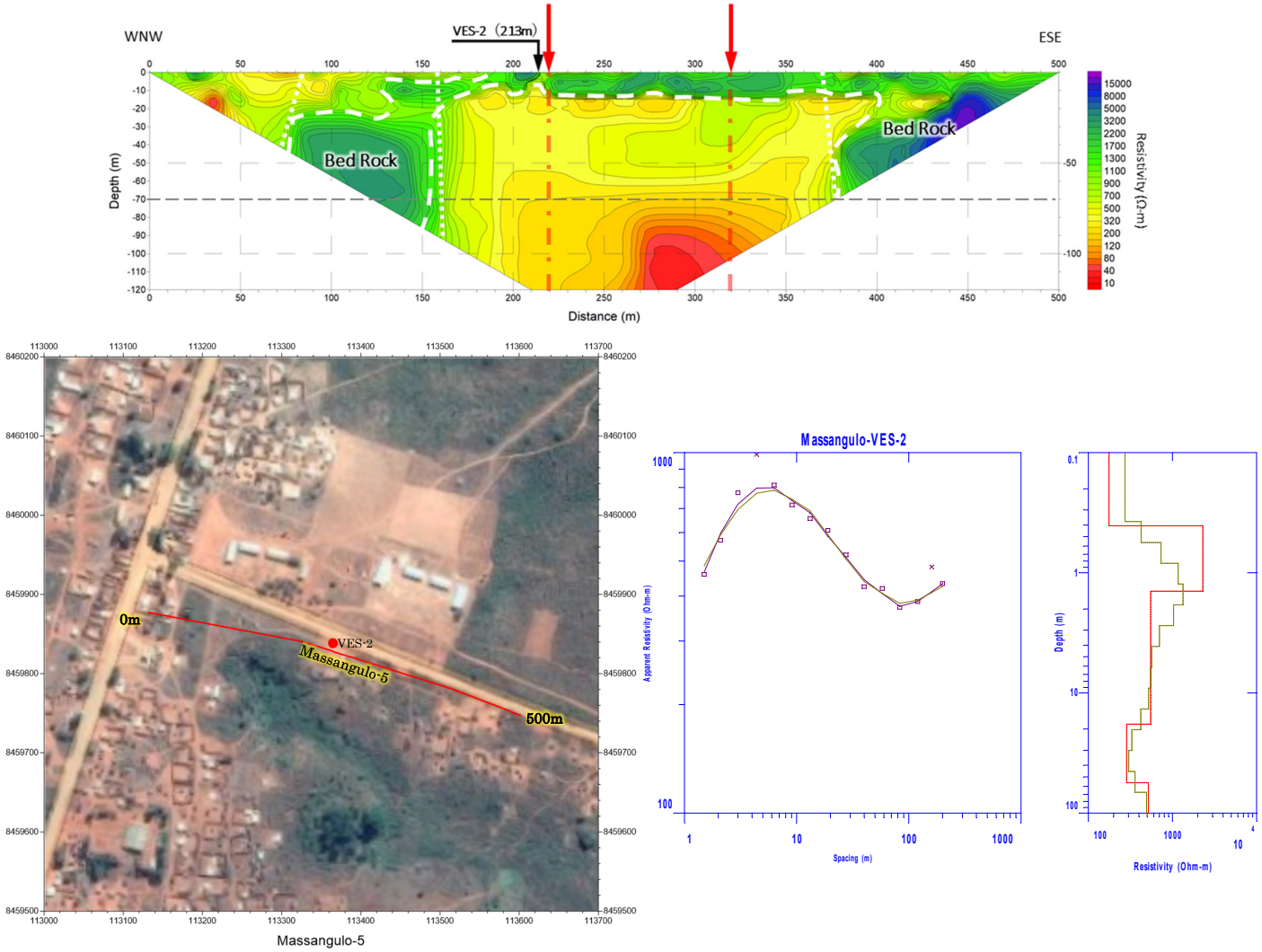


図 34　Massangulo-5 物理探査の位置と解析結果

物理探査作業風景

観測線設置状況 （Majune 郡）	遠電極回収状況 （Majune 郡）
電極への水かけ状況 （Majune 郡）	測定状況 （Majune 郡）
測線伐採状況 （Mandimba 郡）	遠電極設置状況 （Mandimba 郡）

電極棒設置状況 （Mandimba 郡）	観測線設置状況 （Mandimba 郡）
測定状況 （Mandimba 郡）	観測線回収状況 （Muembe 郡）
測定状況 （Muembe 郡）	

資料 8-6 深井戸試掘調査の井戸構造図

RELATÓRIO DE CONCLUSÃO DO FURO

Projecto: Projecto de Construcao de Sistemas de Abastecimento de Agua Rural na Provincia do Niassa	Coordenadas : 36°07′21.19″E ,13°28′31.90″S
	Elevação :715m
Cliente :JAPAN TECHNO CO.,LTD	Nivel de agua :
Unidade de construcao:SUGEC	Data de perfuracao :2019/7/15
Provincia :NIASSA	Profundidade:40m
Distrito: MAJUNE	Diamentro do tubo:
Localização：MALANGA	Diamentro do tubo de medicao:
Código do furo：Maj-1	Diamentro do perfuracao:φ250mm,φ165mm

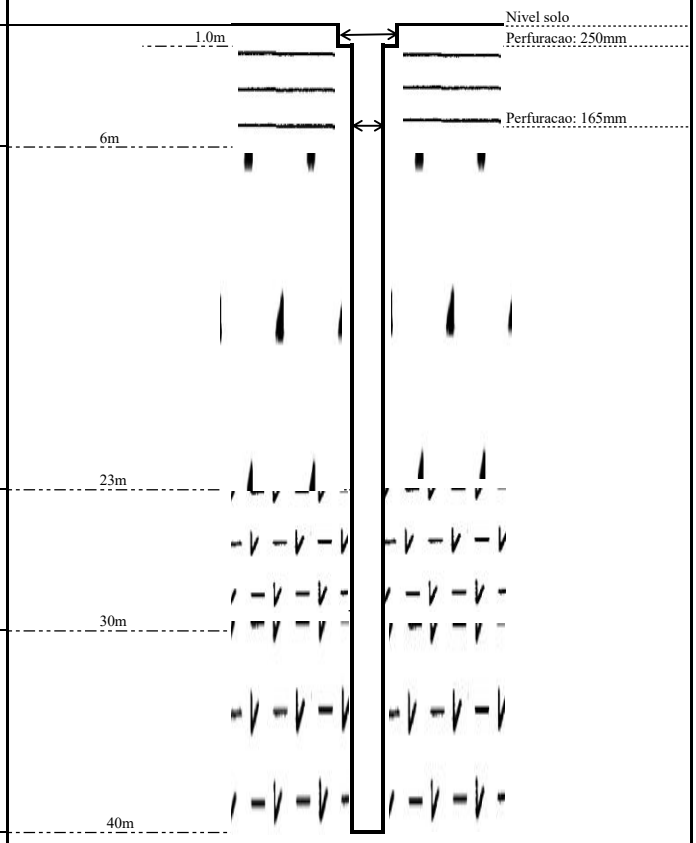
Condutividade:	PH:	Temperatura:	Inclinacao:

Volume estimado de agua: 0 .1 m³/h

Profundidade do estrado(m)	Taxa (m/min)	Esboco estratigrafico	FORMAÇÃO GEOLÓGICA
1m, 2m, 3m, 4m, 5m, 6m	1-6m	1.670 m/min	Solo de cascalho vermelho
7m, 8m, 9m, 10m, 11m, 12m, 13m, 14m, 15m, 16m, 17m, 18m, 19m, 20m, 21m, 22m, 23m	7-23m	0.395 m/min	Solo de cascalho amarelo claro
24m, 25m, 26m, 27m, 28m, 29m, 30m	24-30m	0.152 m/min	Granito cinzento metamorfico
31m, 32m, 33m, 34m, 35m, 36m, 37m, 38m, 39m, 40m	31-40m	0.087 m/min	Granito metamorfico amarelo

DIAGRAMA DO FURO

Negativo



Pelo Empreiteiro :	Pelo Fiscal:
Pelo Perfurador :	Data:

RELATÓRIO DE CONCLUSÃO DO FURO

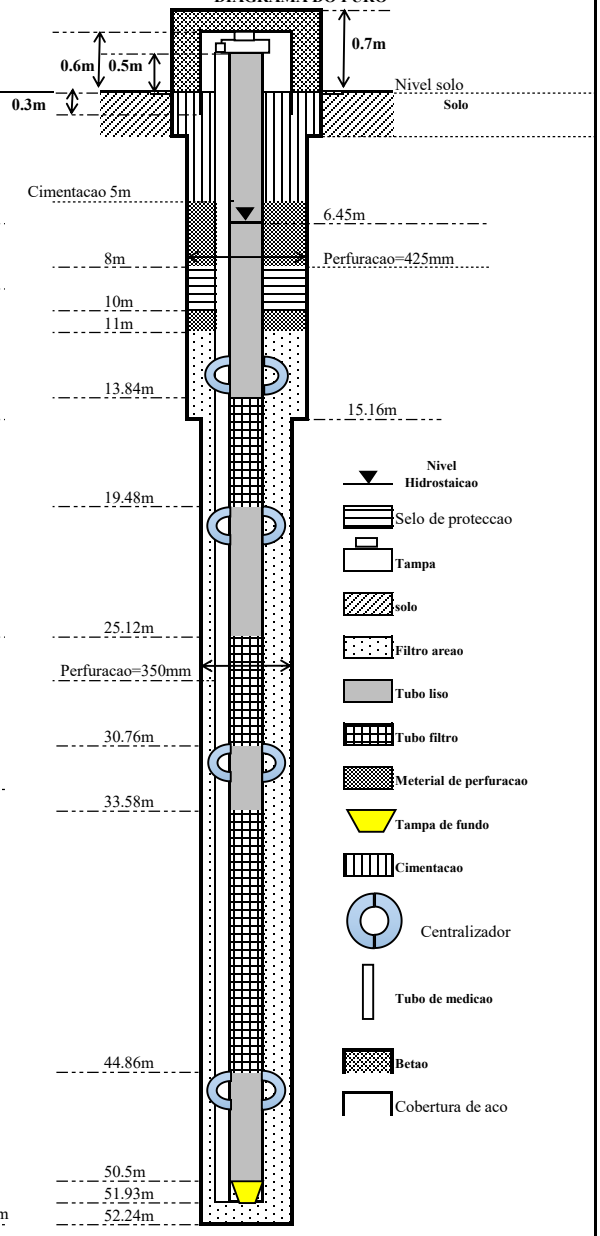
Projecto: Projecto de Construcao de Sistemas de Abastecimento de Agua Rural na Provincia do Niassa	**Coordenadas : 36°07′03.77″E ,13°28′48.55″S**
	Elevação :704m
Cliente :JAPAN TECHNO CO.,LTD	**Nivel de agua :6.45m**
Unidade de construcao:SUGEC	**Data de perfuracao :2019/7/3-2019/7/21**
Provincia :NIASSA	**Profundidade:52.24m**
Distrito: MAJUNE	**Diamentro do tubo:DN200**
Localizacao：MALANGA	**Diamentro do tubo de medicao:φ32mm**
Código do furo：Maj-2	**Diamentro do perfuracao:φ425mm , φ350mm**

Condutividade: 56.84uS/cm	**PH: 6.84**	**Temperatura: 25°C**	**Inclinacao:Qualificado**

Volume estimado de agua: 10 m³/h

Profundidade do estrado(m)		Taxa (m/min)	Esboco estratigrafico	FORMAÇÃO GEOLÓGICA
1m, 2m, 3m, 4m, 5m, 6m	1-6m	0.0798 m/min		Solo de cascalho vemelho
7m, 8m, 9m	7-9m	0.041 m/min		Solo de cascalho amarelo
10m, 11m, 12m, 13m, 14m, 15m	10-15m	0.061 m/min; 0.037m/min; 0.016m/min		Granito resistido marrrom
16m, 17m, 18m, 19m, 20m, 21m, 22m, 23m, 24m, 25m	16-25m	0.016 m/min		Granito cinzento metamorfico
26m, 27m, 28m, 29m, 30m, 31m, 32m	26-32m	0.011 m/min; 0.015 m/min		Arenito vermelho
33m, 34m, 35m, 36m, 37m, 38m, 39m, 40m, 41m, 42m, 43m, 44m, 45m, 46m, 47m, 48m, 49m, 50m, 51m, 52,24m	33-52,24m	0.024 m/min; 0.017 m/min		Granito metamorfico cinzento-preto

DIAGRAMA DO FURO



Pelo Empreiteiro :	**Pelo Fiscal:**
Pelo Perfurador :	**Data:**

RELATÓRIO DE CONCLUSÃO DO FURO

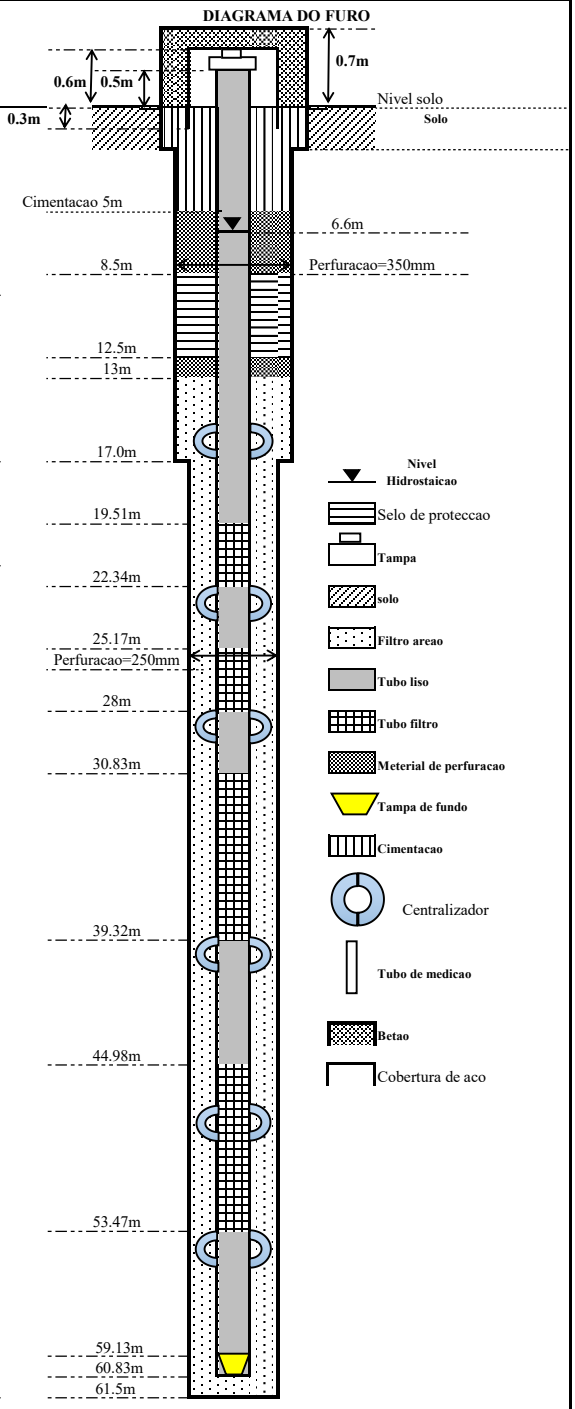
Projecto: Projecto de Construcao de Sistemas de Abastecimento de Agua Rural na Provincia do Niassa	**Coordenadas : 36°07′21.9″E ,13°29′04.2″S**
	Elevação :704m
Cliente :JAPAN TECHNO CO.,LTD	**Nivel de agua :6.6m**
Unidade de construcao:SUGEC	**Data de perfuracao :2019/7/16-2019/7/25**
Provincia :NIASSA	**Profundidade:61.5m**
Distrito: MAJUNE	**Diamentro do tubo:DN150**
Localizacao：MALANGA	**Diamentro do tubo de medicao:**
Código do furo：Maj-3	**Diamentro do perfuracao:φ350mm , φ250mm**

Condutividade: 254uS/cm	**PH: 6.99**	**Temperatura: 24°C**	**Inclinacao:Qualificado**

Volume estimado de agua: 5 m³/h

Profundidade do estrado(m)		Taxa (m/min)	Esboco estratigrafico	FORMAÇÃO GEOLÓGICA
1m, 2m, 3m, 4m, 5m	1-5m	0.755m/min		Solo de cascalho vemelho
6m, 7m, 8m, 9m	6-9m	0.336m/min		Solo de cascalho marrom
10m, 11m, 12m, 13m, 14m, 15m, 16m, 17m	10-17m	1.157m/min		Solo coeso amarelo
18m, 19m, 20m, 21m, 22m	18-22m	0.138m/min		Granito cinzento metamorfico
23m, 24m, 25m, 26m, 27m, 28m, 29m, 30m, 31m, 32m, 33m, 34m, 35m, 36m, 37m, 38m, 39m, 40m, 41m, 42m, 43m, 44m, 45m, 46m, 47m, 48m, 49m, 50m, 51m, 52m, 53m, 54m, 55m, 56m, 57m, 58m, 59m, 60m, 61m, 61,5m	23-61,5m	0.035m/min		Gneiss granito resistido

DIAGRAMA DO FURO



Pelo Empreiteiro :	**Pelo Fiscal:**
Pelo Perfurador :	**Data:**

RELATÓRIO DE CONCLUSÃO DO FURO

Projecto: Projecto de Construcao de Sistemas de Abastecimento de Agua Rural na Provincia do Niassa	**Coordenadas : 35°37′55.69″E ,13°05′27.46″S**
	Elevação :1122m
Cliente :JAPAN TECHNO CO.,LTD	**Nivel de agua :**
Unidade de construcao:SUGEC	**Data de perfuracao :2019/7/23**
Provincia :NIASSA	**Profundidade:34.2m**
Distrito: MUEMBE	**Diamentro do tubo:**
Localizacao:：MUEMBE SEDE	**Diamentro do tubo de medicao:**
Código do furo：Mue-1	**Diamentro do perfuracao:φ300mm ,φ165mm**

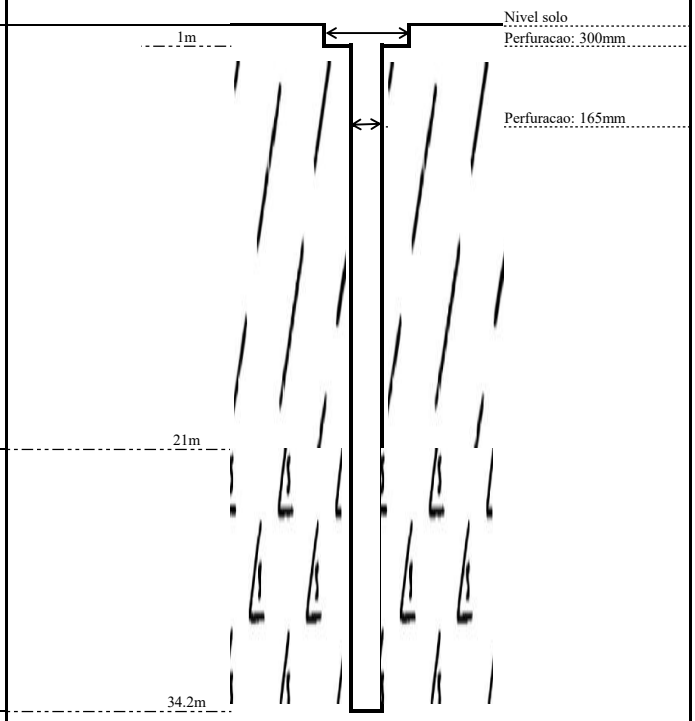
Condutividade:	**PH:**	**Temperatura:**	**Inclinacao:**

Volume estimado de agua: 0 .1 m³/h

Profundidade do estrado(m)		Velocidade(m/min)	Esboco estratigrafico	FORMAÇÃO GEOLÓGICA
1m	1-21m	0.059 m/min		Lodo vermelho
2m				
3m		0.588 m/min		
4m				
5m				
6m				
7m				
8m				
9m				
10m				
11m				
12m				
13m				
14m				
15m				
16m				
17m				
18m				
19m				
20m				
21m				
22m	22-34,2m	0.345 m/min		Solo residual amarelo-castanho
23m				
24m				
25m				
26m				
27m				
28m				
29m				
30m				
31m				
32m				
33m				
34,2m				

DIAGRAMA DO FURO

Negativo



Pelo Empreiteiro :	**Pelo Fiscal:**
Pelo Perfurador :	**Data:**

RELATÓRIO DE CONCLUSÃO DO FURO

Projecto: Projecto de Construcao de Sistemas de Abastecimento de Agua Rural na Provincia do Niassa	**Coordenadas : 35°38′13.94″E ,13°05′01.30″S**
	Elevação :1093m
Cliente :JAPAN TECHNO CO.,LTD	**Nivel de agua :**
Unidade de construcao:SUGEC	**Data de perfuracao :2019/7/23-24**
Provincia :NIASSA	**Profundidade:45m**
Distrito: MUEMBE	**Diamentro do tubo:**
Localizacao：MUEMBE SEDE	**Diamentro do tubo de medicao:**
Código do furo：Mue-2	**Diamentro do perfuracao:φ300mm ,φ165mm**

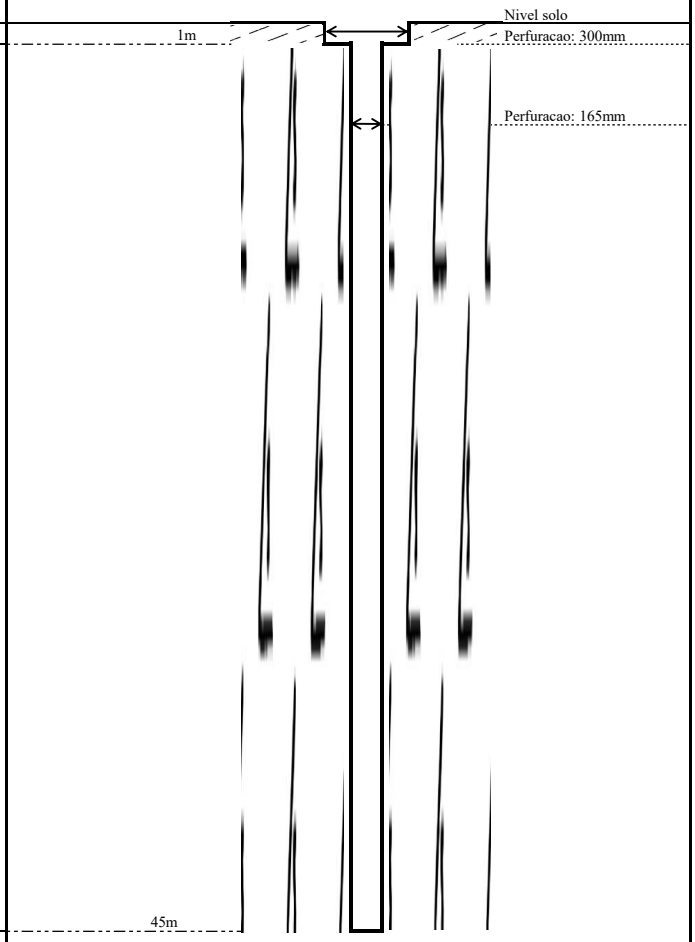
Condutividade:	**PH:**	**Temperatura:**	**Inclinacao:**

Volume estimado de agua: 1 m³/h

Profundidade do estrado(m)		Velocidade(m/min)	Esboco estratigrafico	FORMAÇÃO GEOLÓGICA
1m	0-1m	0.066m/min		Lodo vermelho
2m	2-45m	0.222 m/min		Solo residual amarelo-castanho
3m				
4m				
5m				
6m				
7m				
8m				
9m				
10m				
11m				
12m				
13m				
14m				
15m				
16m				
17m				
18m				
19m				
20m				
21m				
22m				
23m				
24m				
25m				
26m				
27m				
28m				
29m				
30m				
31m				
32m				
33m				
34m				
35m				
36m				
37m				
38m				
39m				
40m				
41m				
42m				
43m				
44m				
45m				

DIAGRAMA DO FURO

Negativo



Pelo Empreiteiro :	**Pelo Fiscal:**
Pelo Perfurador :	**Data:**

RELATÓRIO DE CONCLUSÃO DO FURO

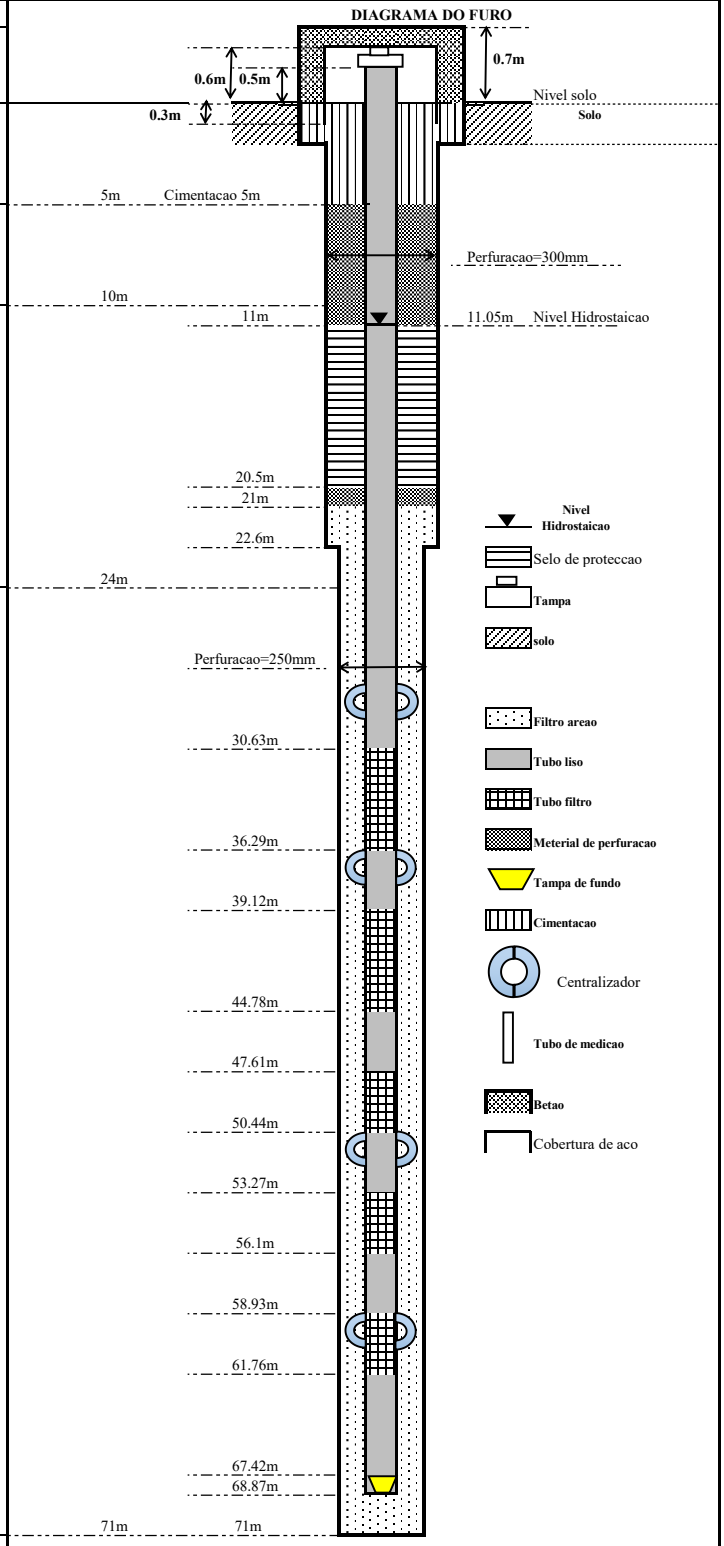
Projecto: Projecto de Construcao de Sistemas de Abastecimento de Agua Rural na Provincia do Niassa	Coordenadas : 35°38′57.68″E ,13°05′50.01″S
	Elevação :1086m
Cliente :JAPAN TECHNO CO.,LTD	Nivel de agua :11.05m
Unidade de construcao:SUGEC	Data de perfuracao :2019/7/25-2019/8/2
Provincia :NIASSA	Profundidade:71m
Distrito: MUEMBE	Diamentro do tubo:DN150
Localizacao：MUEMBE SEDE	Diamentro do tubo de medicao:
Código do furo：Mue-3	Diamentro do perfuracao:φ300mm , φ250mm

Condutividade: 90uS/cm	PH: 7.1	Temperatura: 23ºC	Inclinacao:Qualificado

Volume estimado de agua: 5 m³/h

Profundidade do estrado(m)		Taxa (m/min)	Esboco estratigrafico	FORMAÇÃO GEOLÓGICA
1m, 2m, 3m, 4m, 5m	1-5m	0.57m/min		Solo coeso vermelho
6m, 7m, 8m, 9m, 10m	6-10m	0.59m/min		Solo coeso amarelo
11m, 12m, 13m, 14m, 15m, 16m, 17m, 18m, 19m, 20m, 21m, 22m, 23m, 24m	11-24m	0.17m/min		Solo resistido marrom amarelo
25m, 26m, 27m, 28m, 29m, 30m, 31m, 32m, 33m, 34m, 35m, 36m, 37m, 38m, 39m, 40m, 41m, 42m, 43m, 44m, 45m, 46m, 47m, 48m, 49m, 50m, 51m, 52m, 53m, 54m, 55m, 56m, 57m, 58m, 59m, 60m, 61m, 62m, 63m, 64m, 65m, 66m, 67m, 68m, 69m, 70m, 71m	25-71m	0.08m/min		Granodiorito cinza-branco

DIAGRAMA DO FURO



Pelo Empreiteiro :	Pelo Fiscal:
Pelo Perfurador :	Data:

RELATÓRIO DE CONCLUSÃO DO FURO

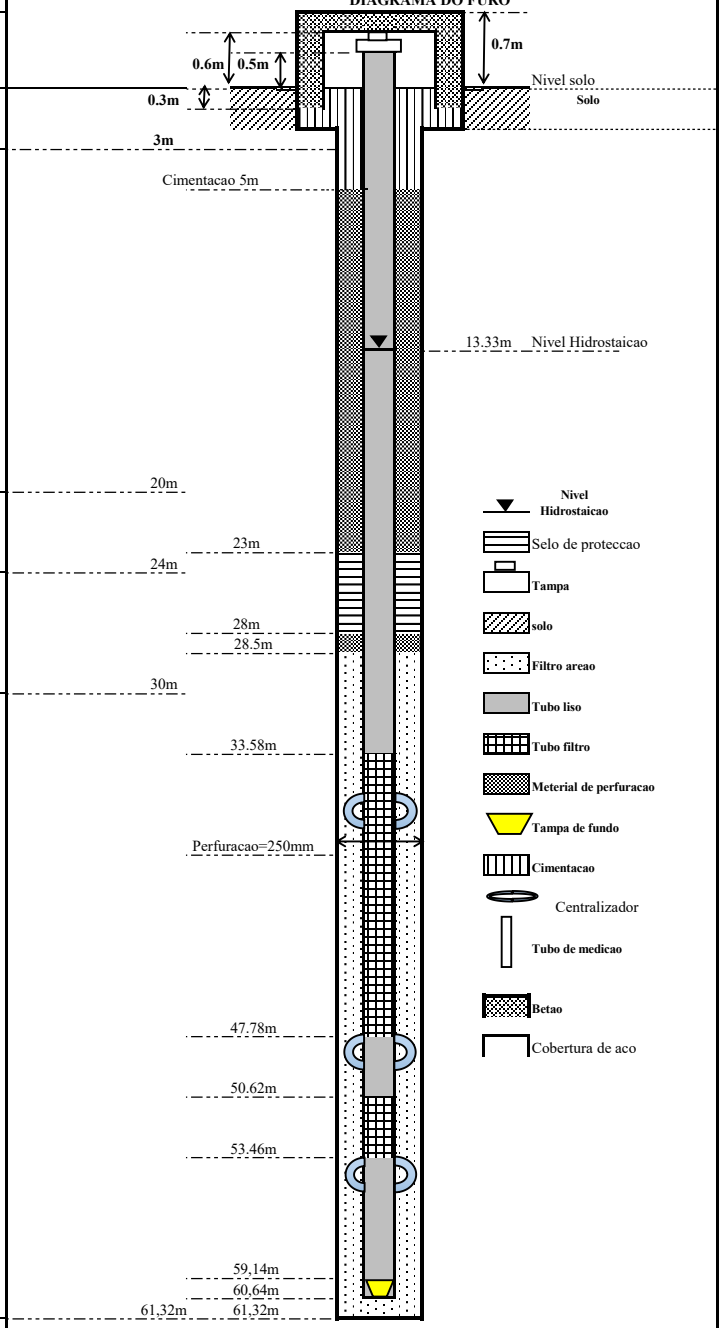
Projecto: Projecto de Construcao de Sistemas de Abastecimento de Agua Rural na Provincia do Niassa	Coordenadas :35°38′44.81″E ,13°04′53.18″S
	Elevação :1091m
Cliente :JAPAN TECHNO CO.,LTD	Nivel de agua :13.33m
Unidade de construcao:SUGEC	Data de perfuracao :2019/7/30-2019/8/3
Provincia :NIASSA	Profundidade:61.32m
Distrito: MUEMBE	Diamentro do tubo:DN150
Localizacao：MUEMBE SEDE	Diamentro do tubo de medicao:
Código do furo：Mue-4	Diamentro do perfuracao: φ250mm

Condutividade: 130uS/cm	PH:7.1	Temperatura: 25ºC	Inclinacao:Qualificado

Volume estimado de agua: 2 m³/h

Profundidade do estrado(m)		Taxa (m/min)	Esboco estratigrafico	FORMAÇÃO GEOLÓGICA
1m, 2m, 3m	1-3m	0.83m/min		Solo coeso vermelho
4m, 5m, 6m, 7m, 8m, 9m, 10m, 11m, 12m, 13m, 14m, 15m, 16m, 17m, 18m, 19m, 20m	4-20m	0.61m/min		Solo po vermelho
21m, 22m, 23m, 24m	21-24m	0.78m/min		Solo resistido marrom amarelo
25m, 26m, 27m, 28m, 29m, 30m	25-30m	0.94m/min		Solo coeso po vermelho
31m, 32m, 33m, 34m, 35m, 36m, 37m, 38m, 39m, 40m, 41m, 42m, 43m, 44m, 45m, 46m, 47m, 48m, 49m, 50m, 51m, 52m, 53m, 54m, 55m, 56m, 57m, 58m, 59m, 60m, 61,32m	31-61,32m	0.06m/min		Gnaisse totalmente intemperizados

DIAGRAMA DO FURO



Pelo Empreiteiro :	Pelo Fiscal:
Pelo Perfurador :	Data:

RELATÓRIO DE CONCLUSÃO DO FURO

Projecto: Projecto de Construcao de Sistemas de Abastecimento de Agua Rural na Provincia do Niassa	**Coordenadas : 36°15′22.71″E ,12°34′25.29″S**
	Elevação :803m
Cliente :JAPAN TECHNO CO.,LTD	**Nivel de agua :**
Unidade de construcao:SUGEC	**Data de perfuracao :2019/8/4-2019/8/5**
Provincia :NIASSA	**Profundidade:50.25m**
Distrito: MAVAGO	**Diamentro do tubo:**
Localização: MAVAGO SEDE	**Diamentro do tubo de medicao:**
Código do furo: Mav-1	**Diamentro do perfuracao:φ250mm,φ165mm**

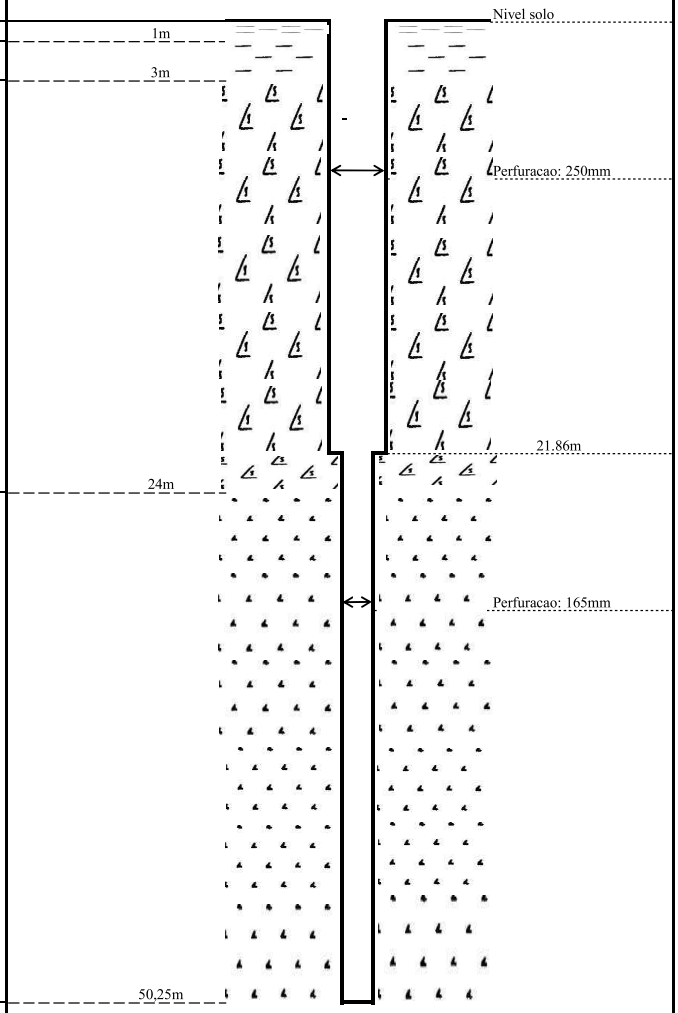
Condutividade:	**PH:**	**Temperatura:**	**Inclinacao:**

Volume estimado de agua: 0 m³/h

Profundidade do estrado(m)		Taxa (m/min)	Esboco estratigrafico	FORMAÇÃO GEOLÓGICA
1m	0-1m	0.21m/min		Solo pegajoso amarelo
2m 3m	2-3m	0.21m/min		Solo coeso vermelho
4m 5m 6m 7m 8m 9m 10m 11m 12m 13m 14m 15m 16m 17m 18m 19m 20m 21m 22m 23m 24m	4-24m	0.08m/min		Solo resistido marrom amarelo
25m 26m 27m 28m 29m 30m 31m 32m 33m 34m 35m 36m 37m 38m 39m 40m 41m 42m 43m 44m 45m 46m 47m 48m 49m 50,25m	25-50,25m	0.07m/min		Granodiorito cinza-branco

DIAGRAMA DO FURO

Negativo



Pelo Empreiteiro :	**Pelo Fiscal:**
Pelo Perfurador :	**Data:**

RELATÓRIO DE CONCLUSÃO DO FURO

Projecto: Projecto de Construcao de Sistemas de Abastecimento de Agua Rural na Provincia do Niassa	Coordenadas : 36°16′00.00″E ,12°33′48.15″S
	Elevação :803m
Cliente :JAPAN TECHNO CO.,LTD	Nivel de agua :12.4m
Unidade de construcao:SUGEC	Data de perfuracao :2019/8/4-2019/8/9
Provincia :NIASSA	Profundidade:51.5m(φ165mm),43.31m(φ250mm)
Distrito: MAVAGO	Diamentro do tubo:DN150
Localizacao：MAVAGO SEDE	Diamentro do tubo de medicao:
Código do furo：Mav-2	Diamentro do perfuracao:φ250mm , φ165mm

Condutividade: 174,3uS/cm	PH: 7.57	Temperatura: 21°C	Inclinacao:Qualificado

Volume estimado de agua: 5 m³/h

Profundidade do estrado(m)		Taxa (m/min)	Esboco estratigrafico	FORMAÇÃO GEOLÓGICA
1m	1-4m	0.01m/min		Argila arenosa amarela
2m				
3m				
4m				
5m	5-51.5m	0.06m/min		Granodiorito cinza-branco
6m				
7m				
8m				
9m				
10m				
11m				
12m				
13m				
14m				
15m				
16m				
17m				
18m				
19m				
20m				
21m				
22m				
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29m				
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31m				
32m				
33m				
34m				
35m				
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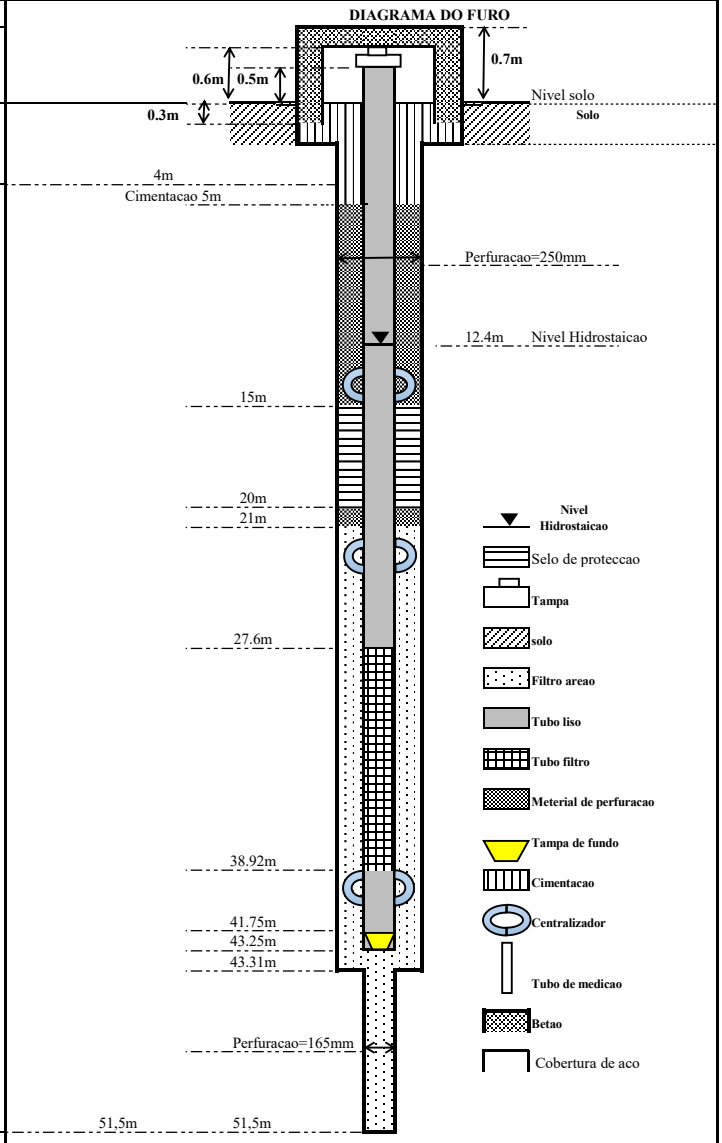
40m				
41m				
42m				
43m				
44m				
45m				
46m				
47m				
48m				
49m				
50m				
51.5m				

DIAGRAMA DO FURO



Pelo Empreiteiro :	Pelo Fiscal:
Pelo Perfurador :	Data:

RELATÓRIO DE CONCLUSÃO DO FURO

Projecto: Projecto de Construcao de Sistemas de Abastecimento de Agua Rural na Provincia do Niassa	**Coordenadas : 36°15′13.92″E ,12°33′06.95″S**
	Elevação :803m
Cliente :JAPAN TECHNO CO.,LTD	**Nivel de agua :**
Unidade de construcao:SUGEC	**Data de perfuracao :2019/8/4-2019/8/5**
Provincia :NIASSA	**Profundidade:50.25m**
Distrito: MAVAGO	**Diamentro do tubo:**
Localização：MAVAGO SEDE	**Diamentro do tubo de medicao:**
Código do furo：Mav-3	**Diamentro do perfuracao:φ250mm,φ165mm**

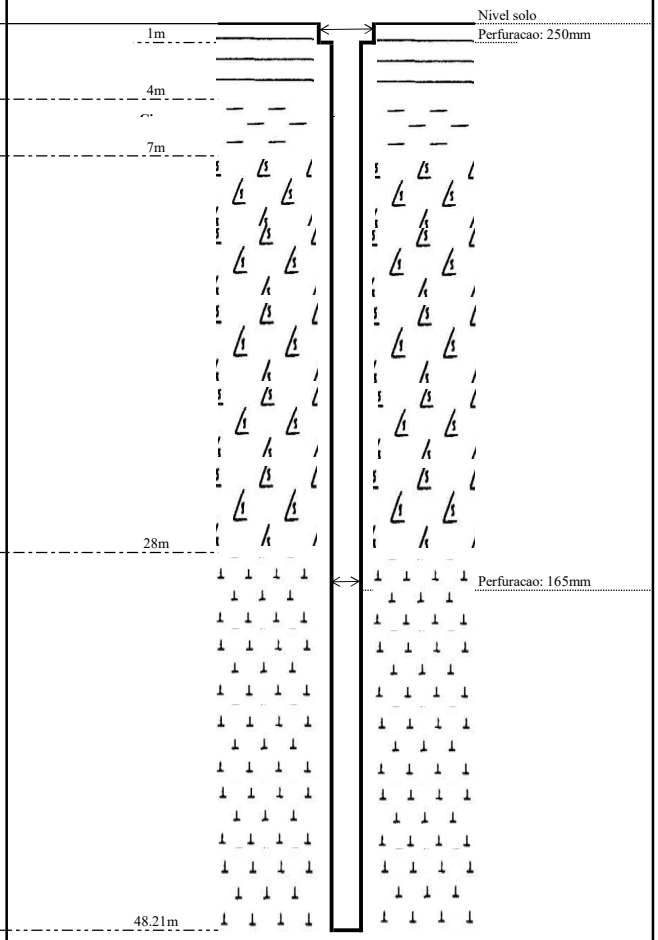
Condutividade:	**PH:**	**Temperatura:**	**Inclinacao:**

Volume estimado de agua: 0 m³/h

Profundidade do estrado(m)		Taxa (m/min)	Esboco estratigrafico	FORMAÇÃO GEOLÓGICA
1m	1-4m	0.297m/min		Solo coeso amarelo
2m				
3m				
4m				
5m	5-7m	0.343m/min		Solo coeso vermelho
6m				
7m				
8m	8-28m	0.416m/min		Solo resistido marrom amarelo
9m				
10m				
11m				
12m				
13m				
14m				
15m				
16m				
17m				
18m				
19m				
20m				
21m				
22m				
23m				
24m				
25m				
26m				
27m				
28m				
29m	29-48.21m	0.054m/min		Granodiorito cinza-branco
30m				
31m				
32m				
33m				
34m				
35m				
36m				
37m				
38m				
39m				
40m				
41m				
42m				
43m				
44m				
45m				
46m				
47m				
48.21m				

DIAGRAMA DO FURO

Negativo



Pelo Empreiteiro :	**Pelo Fiscal:**
Pelo Perfurador :	**Data:**

RELATÓRIO DE CONCLUSÃO DO FURO

Projecto: Projecto de Construcao de Sistemas de Abastecimento de Agua Rural na Provincia do Niassa	**Coordenadas : 36°16′20.14″E ,12°34′09.55″S**
	Elevação :802m
Cliente :JAPAN TECHNO CO.,LTD	**Nivel de agua :**
Unidade de construcao:SUGEC	**Data de perfuracao :2019/8/8-2019/8/10**
Provincia :NIASSA	**Profundidade:51.25m**
Distrito：MAVAGO	**Diamentro do tubo:**
Localizacao：MAVAGO SEDE	**Diamentro do tubo de medicao:**
Código do furo：Mav-4	**Diamentro do perfuracao:φ250mm,φ165mm**

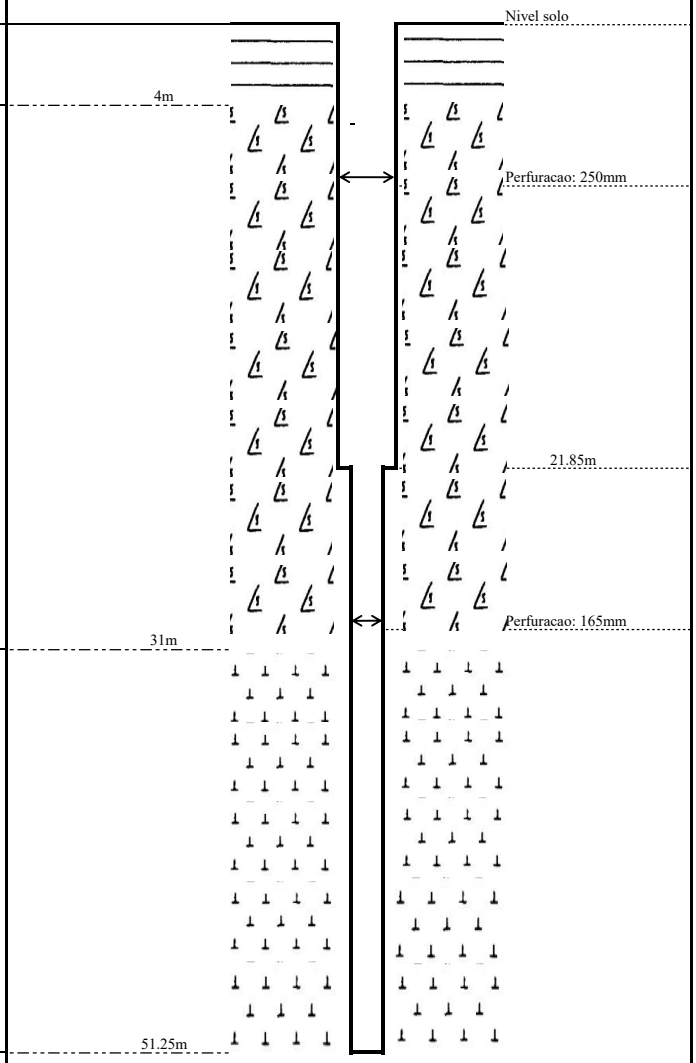
Condutividade:	**PH:**	**Temperatura:**	**Inclinacao:**

Volume estimado de agua: 0 .45 m³/h

Profundidade do estrado(m)		Taxa (m/min)	Esboco estratigrafico	FORMAÇÃO GEOLÓGICA
1m 2m 3m 4m	1-4m	0.632m/min		Solo coeso vermelho
5m 6m 7m 8m 9m 10m 11m 12m 13m 14m 15m 16m 17m 18m 19m 20m 21m 22m 23m 24m 25m 26m 27m 28m 29m 30m 31m	5-31m	0,.292m/min		Solo resistido marrom amarelo
32m 33m 34m 35m 36m 37m 38m 39m 40m 41m 42m 43m 44m 45m 46m 47m 48m 49m 50m 51.25m	32-51.25m	0.105m/min		Granodiorito cinza-branco

DIAGRAMA DO FURO

Negativo



Pelo Empreiteiro :	**Pelo Fiscal:**
Pelo Perfurador :	**Data:**

RELATÓRIO DE CONCLUSÃO DO FURO

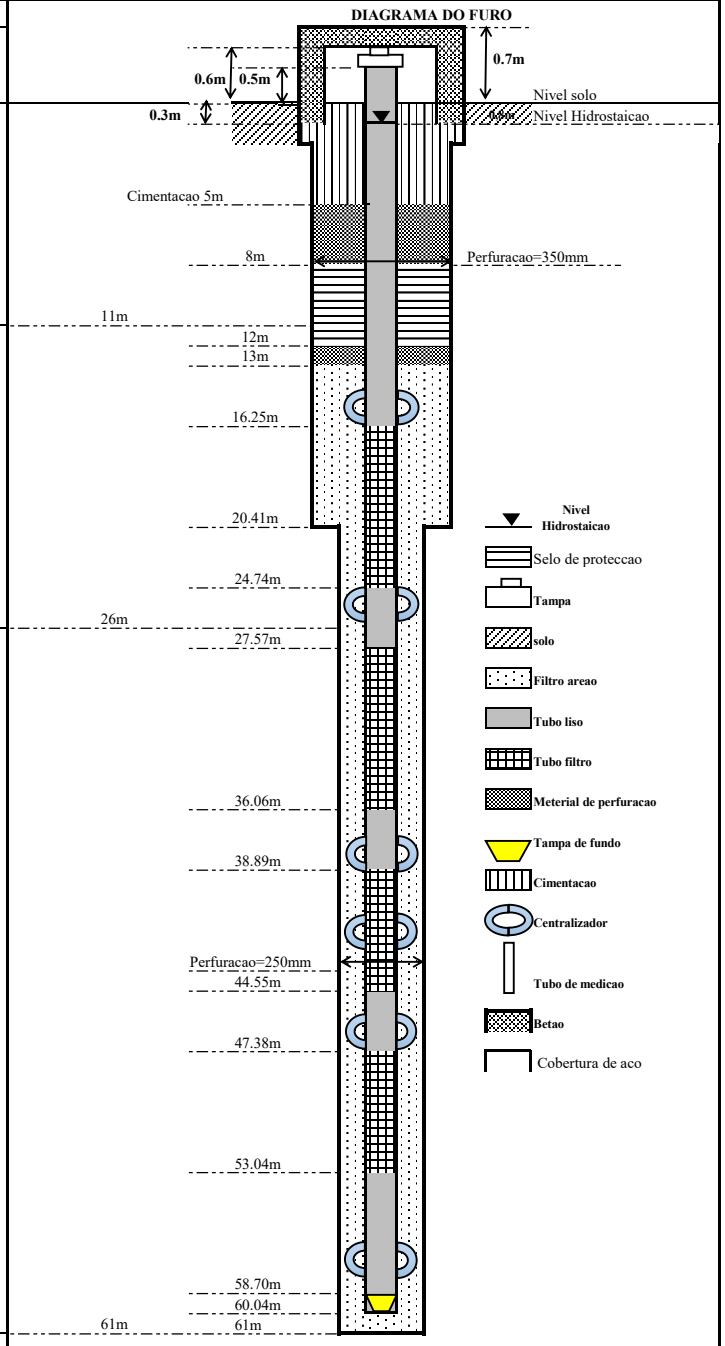
Projecto: Projecto de Construcao de Sistemas de Abastecimento de Agua Rural na Provincia do Niassa	Coordenadas : 36°15′32.54″E ,12°33′31.00″S
	Elevação :847m
Cliente :JAPAN TECHNO CO.,LTD	Nivel de agua :0.8m
Unidade de construcao:SUGEC	Data de perfuracao :2019/8/11-2019/8/20
Provincia :NIASSA	Profundidade:61m
Distrito: MAVAGO	Diamentro do tubo:DN150
Localizacao：MAVAGO SEDE	Diamentro do tubo de medicao:
Código do furo：Mav-5	Diamentro do perfuracao:φ350mm , φ250mm

Condutividade: 56uS/cm	PH:6.55	Temperatura: 21°C	Inclinacao:Qualificado

Volume estimado de agua: 8 m³/h

Profundidade do estrado(m)		Taxa (m/min)	Esboco estratigrafico	FORMAÇÃO GEOLÓGICA
1m–11m	1-11m	0.231m/min		Solo coeso amarelo
12m–26m	12-26m	0.167m/min		Solo resistido marrom amarelo
27m–61m	27-61m	0.050m/min		Granodiorito cinza

DIAGRAMA DO FURO



Pelo Empreiteiro :	Pelo Fiscal:
Pelo Perfurador :	Data:

RELATÓRIO DE CONCLUSÃO DO FURO

Projecto: Projecto de Construcao de Sistemas de Abastecimento de Agua Rural na Provincia do Niassa	**Coordenadas : 35°25′18,95″E ,13°55′02,97″S**
	Elevação :715m
Cliente :JAPAN TECHNO CO.,LTD	**Nivel de agua :**
Unidade de construcao:SUGEC	**Data de perfuracao :2019/8/7-2019/8/9**
Provincia :NIASSA	**Profundidade:50m**
Distrito：NGAUMA	**Diamentro do tubo:**
Localizacao：MASSANGULO	**Diamentro do tubo de medicao:**
Código do furo：Mas-1	**Diamentro do perfuracao:φ250mm,φ165mm**

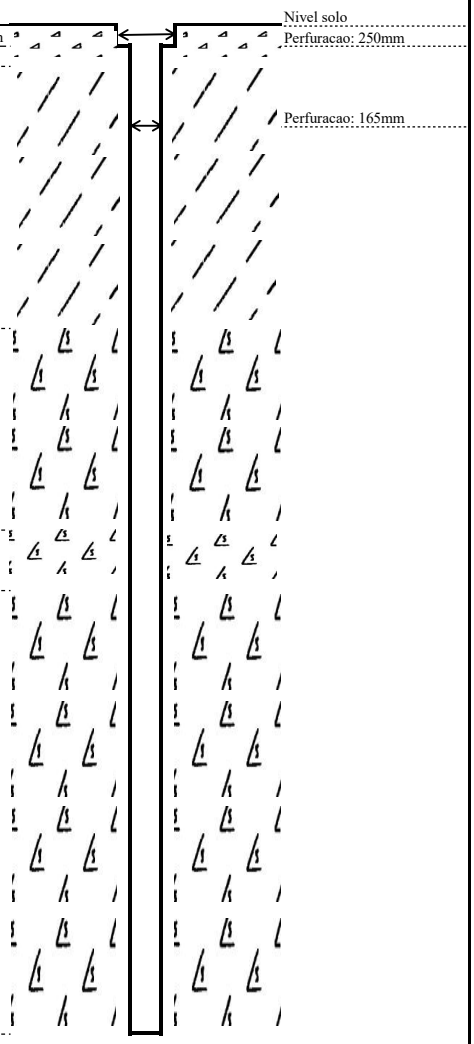
Condutividade:	**PH:**	**Temperatura:**	**Inclinacao:**

Volume estimado de agua: 0 .1 m³/h

Profundidade do estrado(m)		Taxa (m/min)	Esboco estratigrafico	FORMAÇÃO GEOLÓGICA
1m 2m	1-2m	0.187m/min		Cascalho marrom avermelhado
3m 4m 5m 6m 7m 8m 9m 10m 11m 12m 13m 14m 15m	3-15m	0.590 m/min		Cascalho do solo marrom avermelhado
16m 17m 18m 19m 20m 21m 22m 23m 24m 25m	16-25m	1.028m/min		Solo resistido marrom amarelo
26m 27m 28m	26-28m	0.909m/min		Solo resistido marrom avermelhado
29m 30m 31m 32m 33m 34m 35m 36m 37m 38m 39m 40m 41m 42m 43m 44m 45m 46m 47m 48m 49m 50m	29-50m	0.105m/min		Solo resistido marrom amarelo

DIAGRAMA DO FURO

Negativo



Pelo Empreiteiro :	**Pelo Fiscal:**
Pelo Perfurador :	**Data:**

RELATÓRIO DE CONCLUSÃO DO FURO

Projecto: Projecto de Construcao de Sistemas de Abastecimento de Agua Rural na Provincia do Niassa	**Coordenadas : 35°25′23.10″E ,13°54′19.31″S**
	Elevação :1144m
Cliente :JAPAN TECHNO CO.,LTD	**Nivel de agua :**
Unidade de construcao:SUGEC	**Data de perfuracao :2019/8/6-2019/8/7**
Provincia :NIASSA	**Profundidade:70m**
Distrito: NGAUMA	**Diamentro do tubo:**
Localização：MASSANGULO	**Diamentro do tubo de medicao:**
Código do furo：Mas-2	**Diamentro do perfuracao:φ250mm,φ165mm**

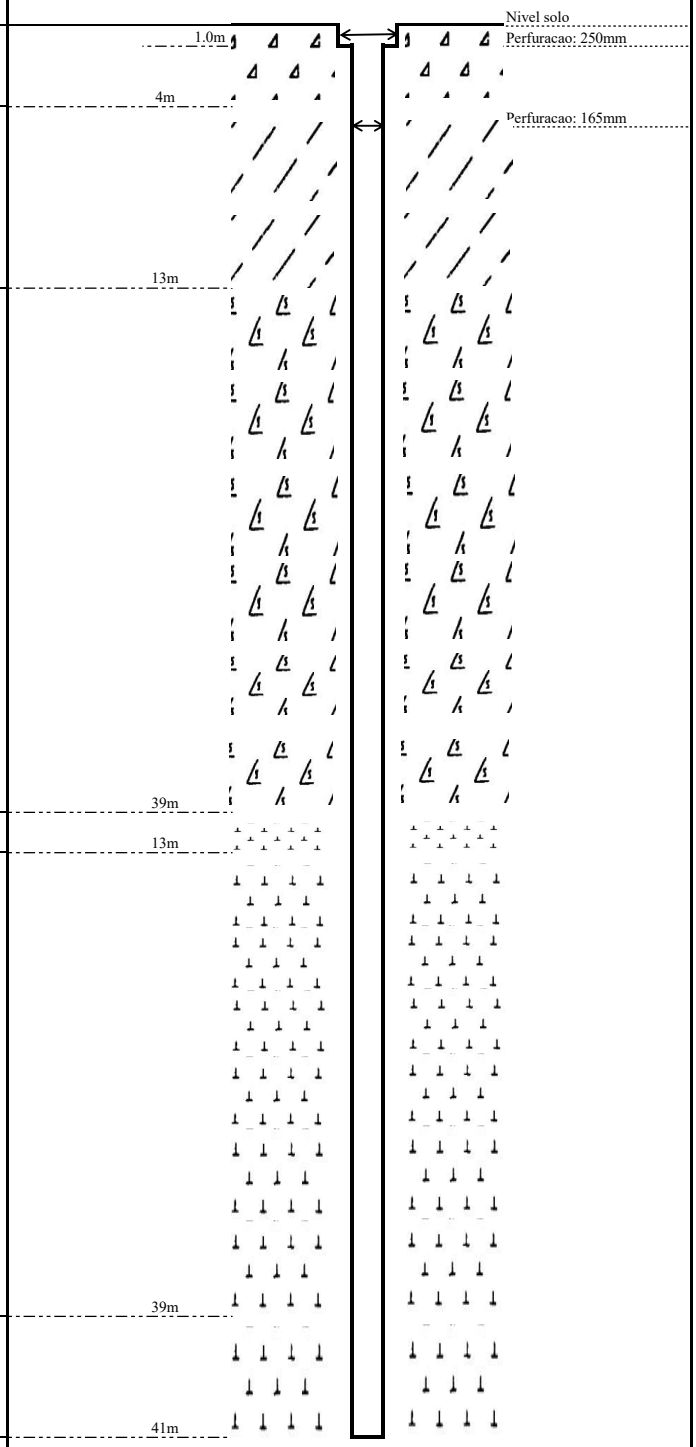
Condutividade:	**PH:**	**Temperatura:**	**Inclinacao:**

Volume estimado de agua: 0 .1 m³/h

Profundidade do estrado(m)		Taxa (m/min)	Esboco estratigrafico	FORMAÇÃO GEOLÓGICA
1m, 2m, 3m, 4m	1-4m	0.761m/min		Cascalho marrom avermelhado
5m, 6m, 7m, 8m, 9m, 10m, 11m, 12m, 13m	5-13m	1.025m/min		Cascalho do solo marrom avermelhado
14m, 15m, 16m, 17m, 18m, 19m, 20m, 21m, 22m, 23m, 24m, 25m, 26m, 27m, 28m, 29m, 30m, 31m, 32m, 33m, 34m, 35m, 36m, 37m, 38m, 39m	14-39m	0.358m/min		Granodiorito branco
40m, 41m	40-41m	0.155m/min		Granodiorito cinza-preto
42m, 43m, 44m, 45m, 46m, 47m, 48m, 49m, 50m, 51m, 52m, 53m, 54m, 55m, 56m, 57m, 58m, 59m, 60m, 61m, 62m, 63m, 64m	42-64m	0.118m/min		Granodiorito cinza-preto
65m, 66m, 67m, 68m, 69m, 70m	65-70m	0.092m/min		Granodiorito cinza-branco

DIAGRAMA DO FURO

Negativo



Pelo Empreiteiro :	**Pelo Fiscal:**
Pelo Perfurador :	**Data:**

RELATÓRIO DE CONCLUSÃO DO FURO

Projecto: Projecto de Construcao de Sistemas de Abastecimento de Agua Rural na Provincia do Niassa	**Coordenadas : 35°25′22,31″E ,13°54′52,42″S**
	Elevação :1129m
Cliente :JAPAN TECHNO CO.,LTD	**Nivel de agua :**
Unidade de construcao:SUGEC	**Data de perfuracao :2019/9/22-2019/9/23**
Provincia :NIASSA	**Profundidade:53,01m**
Distrito: NGAUMA	**Diamentro do tubo:**
Localização：MASSANGULO	**Diamentro do tubo de medicao:**
Código do furo：Mas-3	**Diamentro do perfuracao:φ250mm,φ165mm**

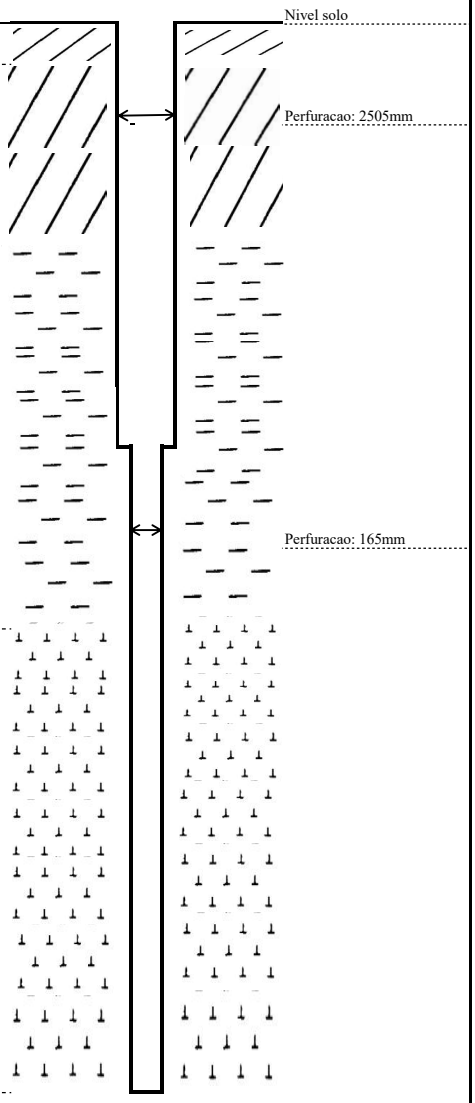
Condutividade:	**PH:**	**Temperatura:**	**Inclinacao:**

Volume estimado de agua: 1,5 m³/h

Profundidade do estrado(m)		Taxa (m/min)	Esboco estratigrafico	FORMAÇÃO GEOLÓGICA
1m, 2m	1-2m	0,958m/min		Solo coeso vermelho
3m, 4m, 5m, 6m, 7m, 8m, 9m, 10m, 11m	3-11m	1,162m/min		Solo coeso amarelo
12m, 13m, 14m, 15m, 16m, 17m, 18m, 19m, 20m, 21m, 22m, 23m, 24m, 25m, 26m, 27m, 28m, 29m, 30m	12-30m	0,376m/min		Solo coeso arenoso amarelo
31m, 32m, 33m, 34m, 35m, 36m, 37m, 38m, 39m, 40m, 41m, 42m, 43m, 44m, 45m, 46m, 47m, 48m, 49m, 50m, 51m, 52m, 53,01m	30-53,01m	0,103m/min		Diorito cinza-branco -cinza-preto

DIAGRAMA DO FURO

Negativo



Pelo Empreiteiro :	**Pelo Fiscal:**
Pelo Perfurador :	**Data:**

RELATÓRIO DE CONCLUSÃO DO FURO

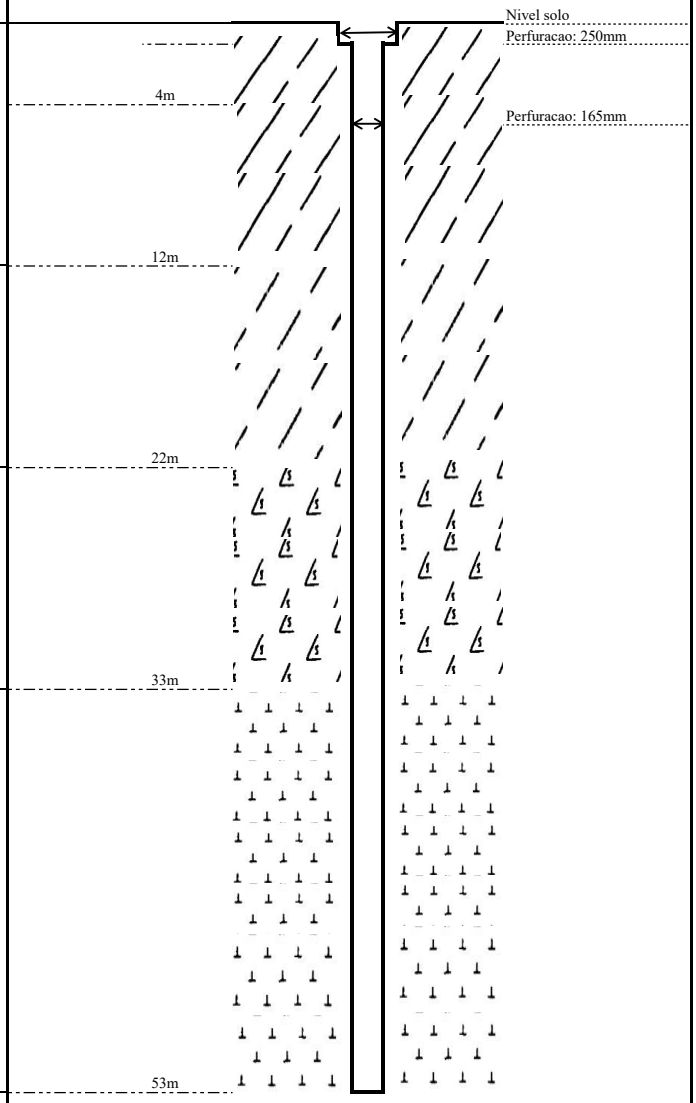
Projecto: Projecto de Construcao de Sistemas de Abastecimento de Agua Rural na Provincia do Niassa	**Coordenadas : 35°25′44.12″E ,13°54′23.60″S**
	Elevação :1102m
Cliente :JAPAN TECHNO CO.,LTD	**Nivel de agua :**
Unidade de construcao:SUGEC	**Data de perfuracao :2019/9/24**
Provincia :NIASSA	**Profundidade:53m**
Distrito: NGAUMA	**Diamentro do tubo:**
Localização：MASSANGULO	**Diamentro do tubo de medicao:**
Código do furo：Mas-4	**Diamentro do perfuracao:φ250mm,φ165mm**

Condutividade:	**PH:**	**Temperatura:**	**Inclinacao:**

Volume estimado de agua: 1.3 m³/h

Profundidade do estrado(m)	Taxa (m/min)	Esboco estratigrafico	FORMAÇÃO GEOLÓGICA
1m, 2m, 3m, 4m, 5m, 6m, 7m, 8m, 9m, 10m, 11m, 12m	1-12m	0,390m/min	Argila de po vermelho
13m, 14m, 15m, 16m, 17m, 18m, 19m, 20m, 21m, 22m	13-22m	0,767m/min	Solo de tempo integral cinza
23m, 24m, 25m, 26m, 27m, 28m, 29m, 30m, 31m, 32m, 33m	23-33m	0,395m/min	Residentro de bronzeado
34m, 35m, 36m, 37m, 38m, 39m, 40m, 41m, 42m, 43m, 44m, 45m, 46m, 47m, 48m, 49m, 50m, 51m, 52m, 53m	34-53m	0,109m/min	Diorito cinza-preto

Negativo



Pelo Empreiteiro :	**Pelo Fiscal:**
Pelo Perforador :	**Data:**

RELATÓRIO DE CONCLUSÃO DO FURO

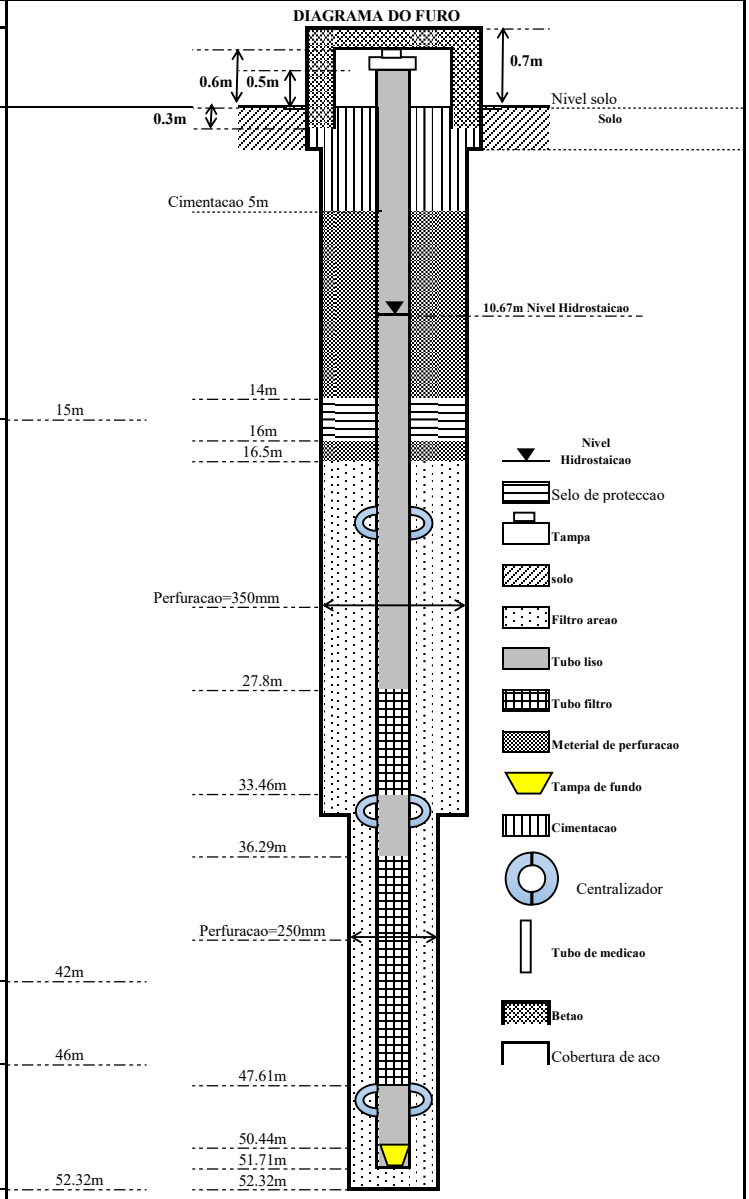
Projecto: Projecto de Construcao de Sistemas de Abastecimento de Agua Rural na Provincia do Niassa	**Coordenadas : 35°40′48.83″E ,14°21′27.08″S**
	Elevação :740m
Cliente :JAPAN TECHNO CO.,LTD	**Nivel de agua :10.67m**
Unidade de construcao:SUGEC	**Data de perfuracao :2019/8/11-2019/8/21**
Provincia :NIASSA	**Profundidade:52.32m**
Distrito：MANDIMBA	**Diamentro do tubo:DN150**
Localizacao：MANDIMBA SEDE	**Diamentro do tubo de medicao:**
Código do furo：Man-1	**Diamentro do perfuracao:φ350mm,φ250mm**

Condutividade: 160uS/cm	**PH: 7.53**	**Temperatura: 22.3°C**	**Inclinacao:Qualificado**

Volume estimado de agua: 8 m³/h

Profundidade do estrado(m)	Taxa (m/min)	Esboco estratigrafico	FORMAÇÃO GEOLÓGICA
1m, 2m, 3m, 4m, 5m, 6m, 7m, 8m, 9m, 10m, 11m, 12m, 13m, 14m, 15m	1-15m	0.261m/min	Solo coeso amarelo
16m, 17m, 18m, 19m, 20m, 21m, 22m, 23m, 24m, 25m, 26m, 27m, 28m, 29m, 30m, 31m, 32m, 33m, 34m, 35m, 36m, 37m, 38m, 39m, 40m, 41m, 42m	16-42m	0.071m/min	Solo de argila marrom amarelo
43m, 44m, 45m, 46m	43-46m	0.04m/min	Cascalho marrom amarelo
47m, 48m, 49m, 50m, 51m, 52.32m	47-52.32m	0.03m/min	Granodiorito cinza

DIAGRAMA DO FURO



Pelo Empreiteiro :	**Pelo Fiscal:**
Pelo Perfurador :	**Data:**

RELATÓRIO DE CONCLUSÃO DO FURO

Projecto: Projecto de Construcao de Sistemas de Abastecimento de Agua Rural na Provincia do Niassa	**Coordenadas : 35°41′00.52″E ,14°21′19.93″S**
	Elevação :734m
Cliente :JAPAN TECHNO CO.,LTD	**Nivel de agua :**
Unidade de construcao:SUGEC	**Data de perfuracao :2019/8/10-2019/8/11**
Provincia :NIASSA	**Profundidade:50m**
Distrito：MANDIMBA	**Diamentro do tubo:**
Localizacao：MANDIMBA SEDE	**Diamentro do tubo de medicao:**
Código do furo：Man-2	**Diamentro do perfuracao:φ250mm,φ165mm**

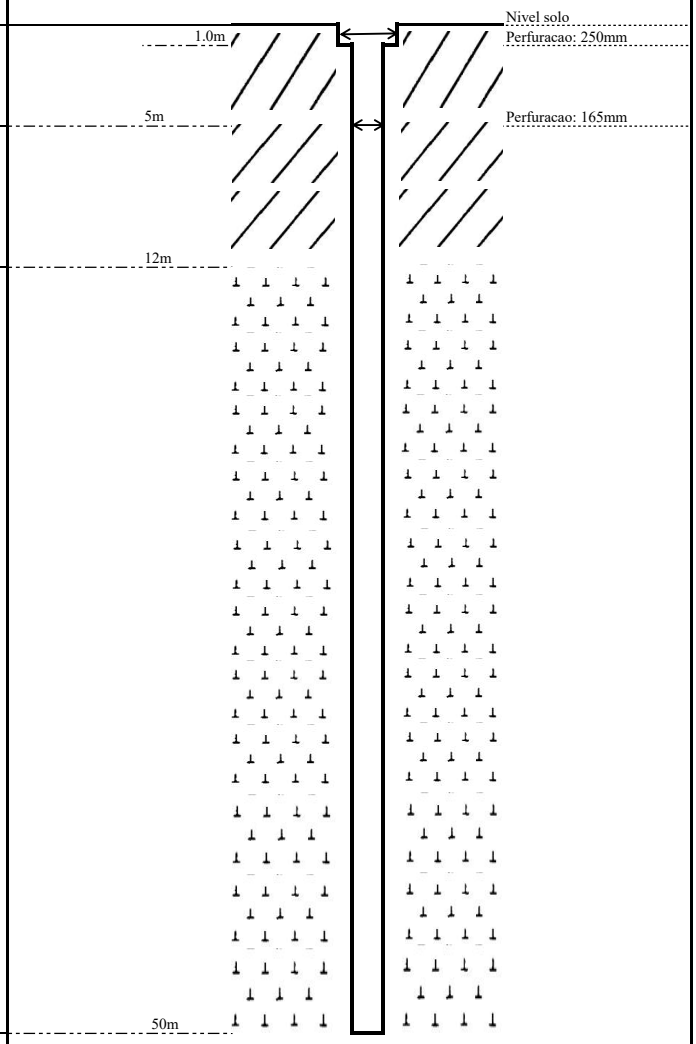
Condutividade:	**PH:**	**Temperatura:**	**Inclinacao:**

Volume estimado de agua: 0 .3 m³/h

Profundidade do estrado(m)		Taxa (m/min)	Esboco estratigrafico	FORMAÇÃO GEOLÓGICA
1m 2m 3m 4m 5m	1-5m	0.326m/min		Solo coeso vermelho
6m 7m 8m 9m 10m 11m 12m	6-12m	0.184m/min		Solo coeso amarelo claro
13m 14m 15m 16m 17m 18m 19m 20m 21m 22m 23m 24m 25m 26m 27m 28m 29m 30m 31m 32m 33m 34m 35m 36m 37m 38m 39m 40m 41m 42m 43m 44m 45m 46m 47m 48m 49m 50m	13-50m	0.123m/min		Granodiorito cinza a granulado perto

DIAGRAMA DO FURO

Negativo



Pelo Empreiteiro :	**Pelo Fiscal:**
Pelo Perfurador :	**Data:**

RELATÓRIO DE CONCLUSÃO DO FURO

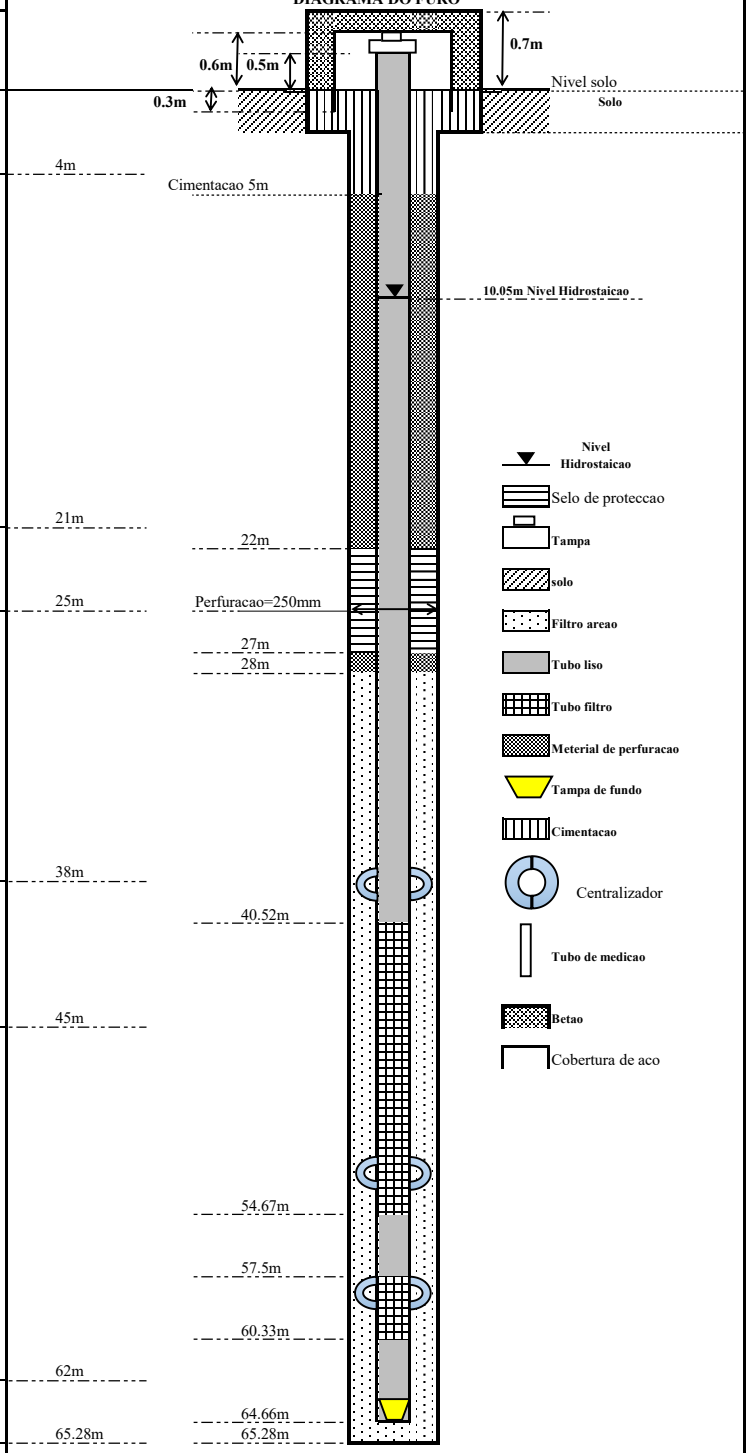
Projecto: Projecto de Construcao de Sistemas de Abastecimento de Agua Rural na Provincia do Niassa	**Coordenadas : 35°40′53.10″E ,14°21′24.26″S**
	Elevação :734m
Cliente :JAPAN TECHNO CO.,LTD	**Nivel de agua :10.05m**
Unidade de construcao:SUGEC	**Data de perfuracao :2019/8/11-2019/8/16**
Provincia :NIASSA	**Profundidade:65.28m**
Distrito：MANDIMBA	**Diamentro do tubo:DN150**
Localizacao：MANDIMBA SEDE	**Diamentro do tubo de medicao:**
Código do furo：Man-2(A)	**Diamentro do perfuracao:φ250mm**

Condutividade: 340uS/cm	**PH: 7.13**	**Temperatura: 21°C**	**Inclinacao:Qualificado**

Volume estimado de agua: 5 m³/h

Profundidade do estrado(m)		Taxa (m/min)	Esboco estratigrafico	FORMAÇÃO GEOLÓGICA
1m, 2m, 3m, 4m	1-4m	0.482m/min		Solo coeso vemelho
5m, 6m, 7m, 8m, 9m, 10m, 11m, 12m, 13m, 14m, 15m, 16m, 17m, 18m, 19m, 20m, 21m	5-21m	0.227m/min		Solo coeso amarelo
22m, 23m, 24m, 25m	22-25m	0.252m/min		solo residual amarelo-castanho
26m, 27m, 28m, 29m, 30m, 31m, 32m, 33m, 34m, 35m, 36m, 37m, 38m	26-38m	0.203m/min		Lodo marrom amarelo
39m, 40m, 41m, 42m, 43m, 44m, 45m	39-45m	0.383m/min		Areia de cascalho marrom amarelo
46m, 47m, 48m, 49m, 50m, 51m, 52m, 53m, 54m, 55m, 56m, 57m, 58m, 59m, 60m, 61m, 62m	45-62m	0.102m/min		Areia grossa marrom e cascalho
63m, 64m, 65.28m	63-65.28m	0.026m/min		Granodiorito cinza

DIAGRAMA DO FURO



Pelo Empreiteiro :	**Pelo Fiscal:**
Pelo Perfurador :	**Data:**

RELATÓRIO DE CONCLUSÃO DO FURO

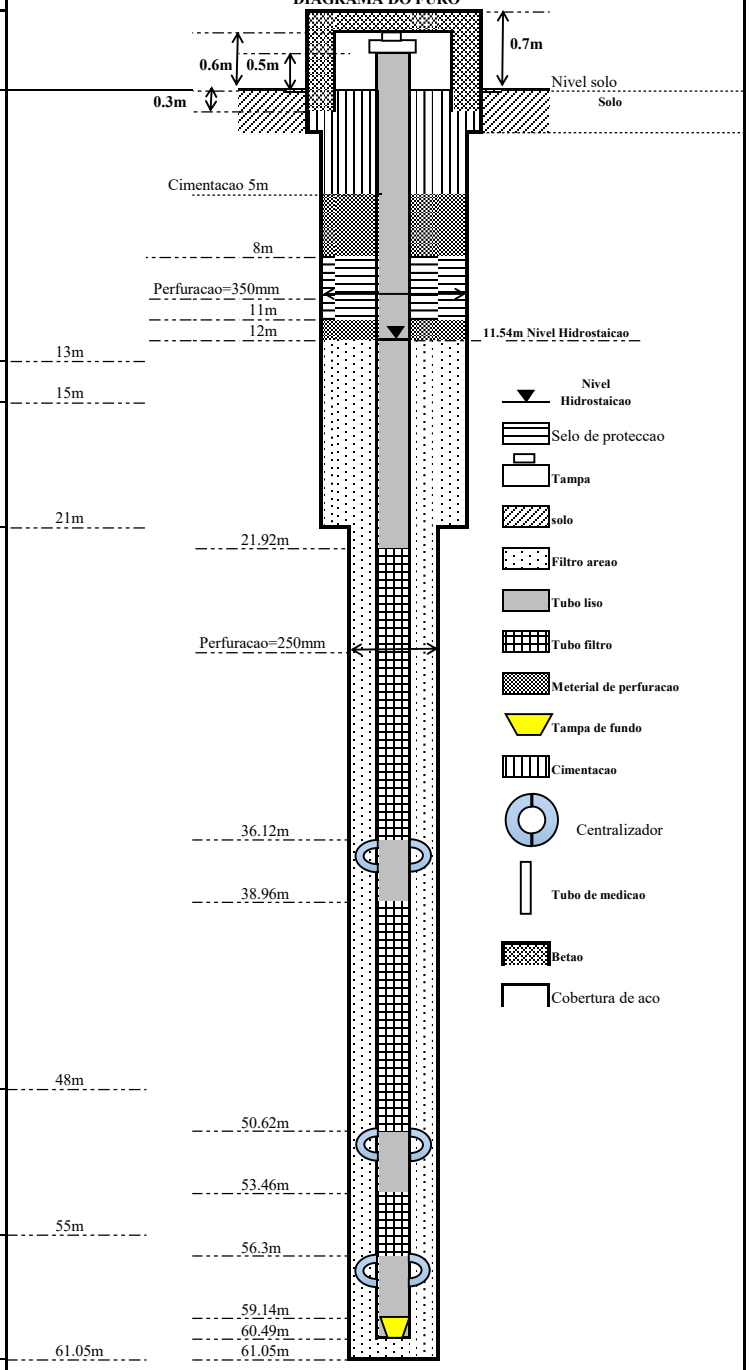
Projecto: Projecto de Construcao de Sistemas de Abastecimento de Agua Rural na Provincia do Niassa	**Coordenadas : 35°40′08.31″E ,14°21′35.84″S**
	Elevação :742m
Cliente :JAPAN TECHNO CO.,LTD	**Nivel de agua :11.54m**
Unidade de construcao:SUGEC	**Data de perfuracao :2019/8/16-2019/9/1**
Provincia :NIASSA	**Profundidade:61.05m**
Distrito：MANDIMBA	**Diamentro do tubo:DN150**
Localizacao：MANDIMBA SEDE	**Diamentro do tubo de medicao:**
Código do furo：Man-7	**Diamentro do perfuracao:φ350mm,φ250mm**

Condutividade: 280uS/cm	**PH: 7.74**	**Temperatura: 22°C**	**Inclinacao:Qualificado**

Volume estimado de agua: 1 m³/h

Profundidade do estrado(m)	Taxa (m/min)	Esboco estratigrafico	FORMAÇÃO GEOLÓGICA
1m, 2m, 3m, 4m, 5m, 6m, 7m, 8m, 9m, 10m, 11m, 12m, 13m	1-13m	0.269m/min	Solo coeso amarelo
14m, 15m	14-15m	0.209m/min	Cascalho marrom amarelo
16m, 17m, 18m, 19m, 20m, 21m	16-21m	0.088m/min	Solo resistido marrom amarelo
22m, 23m, 24m, 25m, 26m, 27m, 28m, 29m, 30m, 31m, 32m, 33m, 34m, 35m, 36m, 37m, 38m, 39m, 40m, 41m, 42m, 43m, 44m, 45m, 46m, 47m, 48m	22-48m	0.047m/min	Cascalho marrom amarelo
49m, 50m, 51m, 52m, 53m, 54m, 55m	49-55m	0.025m/min	Granodiorito cinza-branco
56m, 57m, 58m, 59m, 60m, 61.05m	56-61.05m	0.028m/min	Gemstone cinza-verde

DIAGRAMA DO FURO



Pelo Empreiteiro :	**Pelo Fiscal:**
Pelo Perfurador :	**Data:**

RELATÓRIO DE CONCLUSÃO DO FURO

Projecto: Projecto de Construcao de Sistemas de Abastecimento de Agua Rural na Provincia do Niassa	**Coordenadas : 35°38′54.37″E ,14°21′51.92″S**
	Elevação :759m
Cliente :JAPAN TECHNO CO.,LTD	**Nivel de agua :**
Unidade de construcao:SUGEC	**Data de perfuracao :2019/9/3-2019/9/7**
Provincia :NIASSA	**Profundidade:43m**
Distrito：MANDIMBA	**Diamentro do tubo:**
Localizacao：MANDIMBA SEDE	**Diamentro do tubo de medicao:**
Código do furo：Man-9	**Diamentro do perfuracao:φ250mm,φ165mm**

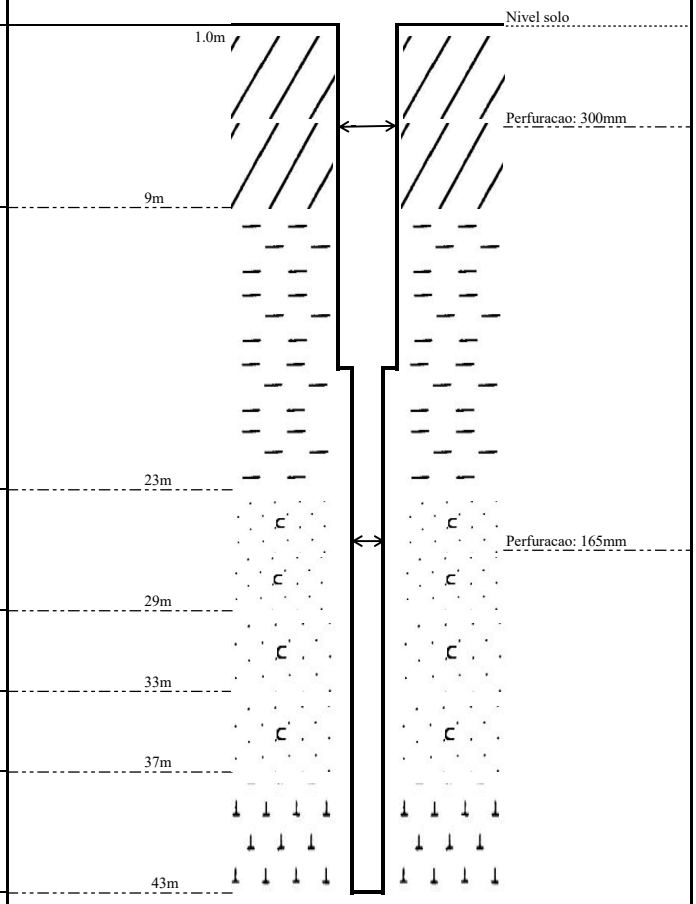
Condutividade:	**PH:**	**Temperatura:**	**Inclinacao:**

Volume estimado de agua: 1.0 m³/h

Profundidade do estrado(m)		Taxa (m/min)	Esboco estratigrafico	FORMAÇÃO GEOLÓGICA
1m, 2m, 3m, 4m, 5m, 6m, 7m, 8m, 9m	1-9m	0.260m/min		Solo coeso amarelo
10m, 11m, 12m, 13m, 14m, 15m, 16m, 17m, 18m, 19m, 20m, 21m, 22m, 23m	10-23m	0.105m/min		Argila arenosa amarela
24m, 25m, 26m, 27m, 28m, 29m	24-29m	0.0628m/min		Areia grossa amarela
30m, 31m, 32m, 33m	30-33m	0.034m/min		Areia grossa cinza
34m, 35m, 36m, 37m	34-37m	0.033m/min		Cascalho amarelo
38m, 39m, 40m, 41m, 42m, 43m	38-43m	0.023m/min		Granodiorito cinza-preto

DIAGRAMA DO FURO

Negativo



Pelo Empreiteiro :	**Pelo Fiscal:**
Pelo Perfurador :	**Data:**

RELATÓRIO DE CONCLUSÃO DO FURO

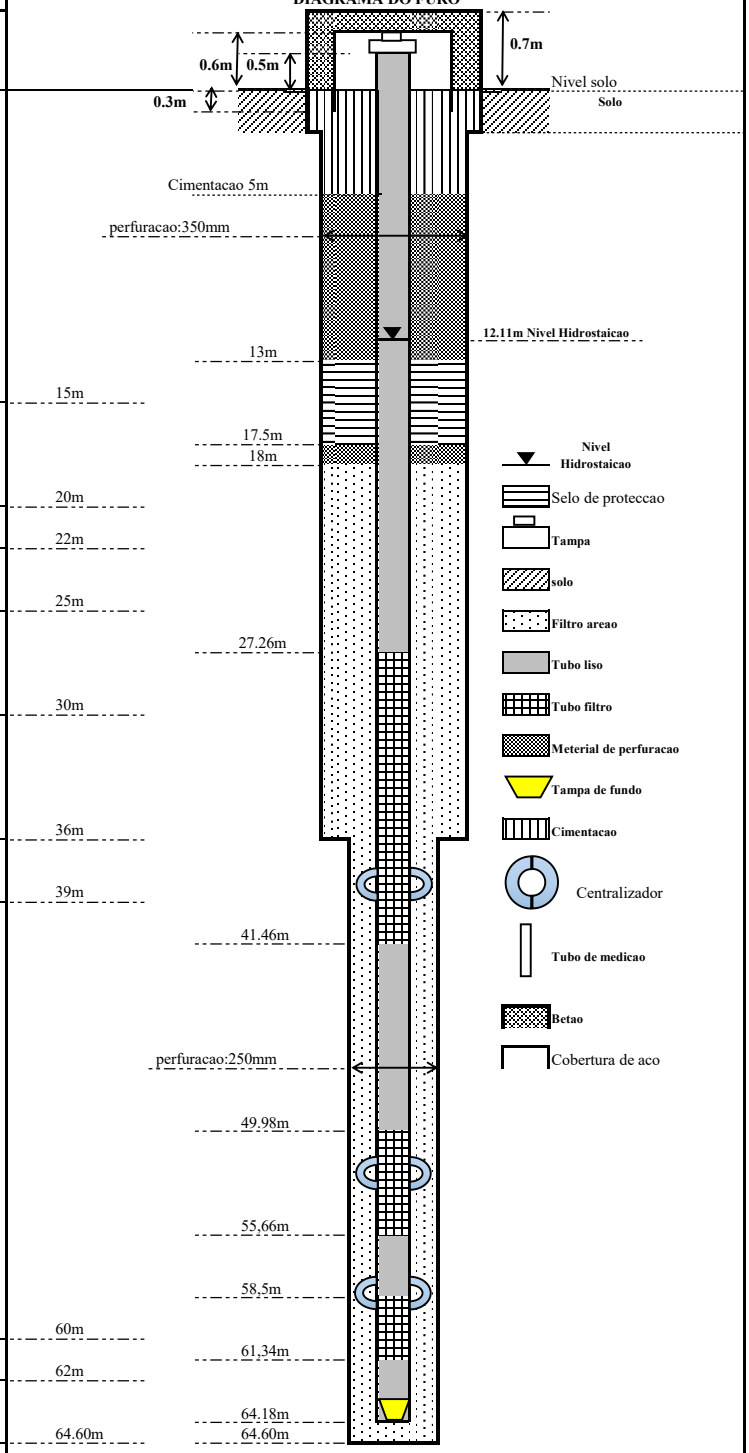
Projecto: Projecto de Construcao de Sistemas de Abastecimento de Agua Rural na Provincia do Niassa	**Coordenadas : 35°40′33.56″E ,14°21′34.85″S**
	Elevação :734m
Cliente :JAPAN TECHNO CO.,LTD	**Nivel de agua :12.11m**
Unidade de construcao:SUGEC	**Data de perfuracao :2019/9/6-2019/9/19**
Provincia :NIASSA	**Profundidade:64.40m**
Distrito：MANDIMBA	**Diamentro do tubo:DN150**
Localizacao：MANDIMBA SEDE	**Diamentro do tubo de medicao:**
Código do furo：Man-10	**Diamentro do perfuracao:φ350mm,φ250mm**

Condutividade: 750uS/cm	**PH: 7.32**	**Temperatura: 22°C**	**Inclinacao:Qualificado**

Volume estimado de agua: 5 m³/h

Profundidade do estrado(m)	Taxa (m/min)	Esboco estratigrafico	FORMAÇÃO GEOLÓGICA
1m, 2m, 3m, 4m, 5m, 6m, 7m, 8m, 9m, 10m, 11m, 12m, 13m, 14m, 15m	1-15m	0.295m/min	Solo coeso vemelho
16m, 17m, 18m, 19m, 20m	16-20m	0.654m/min	Solo de argila amarela
21m, 22m	21-22m	0.575m/min	Areia fina amarela
23m, 24m, 25m	23-25m	0.569m/min	Solo de argila amarela
26m, 27m, 28m, 29m, 30m	26-30m	0.255m/min	Solo coeso amarelo
31m, 32m, 33m, 34m, 35m, 36m	31-36m	0.192m/min	Areia fina amarela
37m, 38m, 39m	37-39m	0.088m/min	Solo de argila amarela
40m, 41m, 42m, 43m, 44m, 45m, 46m, 47m, 48m, 49m, 50m, 51m, 52m, 53m, 54m, 55m, 56m, 57m, 58m, 59m, 60m	40-60m	0.053m/min	Rocha de quartzo branco
61m, 62m	61-62m	0.114m/min	Rocha de quartzo branco cinza
63m, 64m, 64.60m	63-64.60m	0.009m/min	Cinza preto piscando

DIAGRAMA DO FURO



Pelo Empreiteiro :	**Pelo Fiscal:**
Pelo Perfurador :	**Data:**

RELATÓRIO DE CONCLUSÃO DO FURO

Projecto: Projecto de Construcao de Sistemas de Abastecimento de Agua Rural na Provincia do Niassa	**Coordenadas : 35°40′36.48″E ,14°21′41.33″S**
	Elevação :735m
Cliente :JAPAN TECHNO CO.,LTD	**Nivel de agua :**
Unidade de construcao:SUGEC	**Data de perfuracao :2019/8/23-2019/8/25**
Provincia :NIASSA	**Profundidade:40m**
Distrito：MANDIMBA	**Diamentro do tubo:**
Localizacao：MANDIMBA SEDE	**Diamentro do tubo de medicao:**
Código do furo：Man-11	**Diamentro do perfuracao:φ250mm,φ165mm**

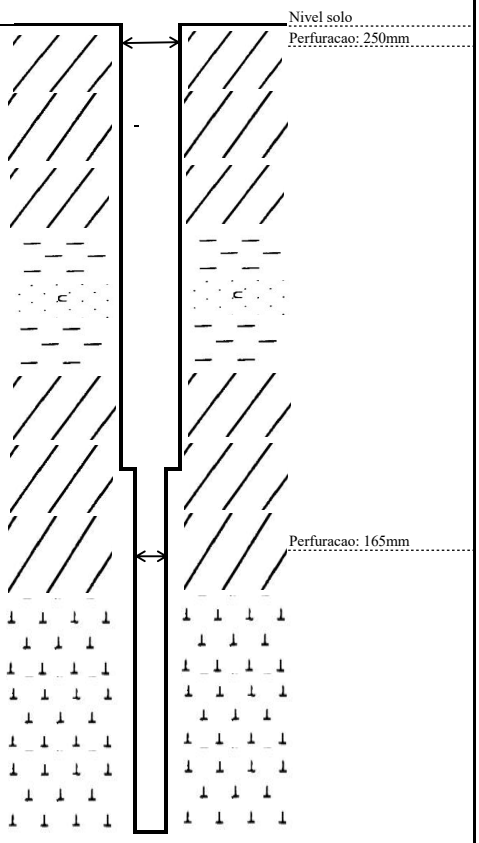
Condutividade:	**PH:**	**Temperatura:**	**Inclinacao:**

Volume estimado de agua: 0 .1 m³/h

Profundidade do estrado(m)		Taxa (m/min)	Esboco estratigrafico	FORMAÇÃO GEOLÓGICA
1m 2m 3m 4m 5m 6m 7m 8m 9m 10m	1-10m	0.315m/min		Solo coeso amarelo
11m 12m 13m 14m 15m 16m 17m	11-17m	0.337m/min		Solo de argila amarela
18m 19m 20m 21m 22m 23m 24m 25m 26m 27m 28m	18-28m	0.093m/min		Argila cinza
29m 30m 31m 32m 33m 34m 35m 36m 37m 38m 39m 40m	29-40m	0.047m/min		Granodiorito cinza-branco

DIAGRAMA DO FURO

Negativo



Pelo Empreiteiro :	**Pelo Fiscal:**
Pelo Perfurador :	**Data:**

RELATÓRIO DE CONCLUSÃO DO FURO

Projecto: Projecto de Construcao de Sistemas de Abastecimento de Agua Rural na Provincia do Niassa	**Coordenadas : 35°39′09.26″E ,14°21′56.90″S**
	Elevação :752m
Cliente :JAPAN TECHNO CO.,LTD	**Nivel de agua :**
Unidade de construcao:SUGEC	**Data de perfuracao :2019/9/02-2019/9/05**
Provincia :NIASSA	**Profundidade:48.27m**
Distrito：MANDIMBA	**Diamentro do tubo:**
Localizacao：MANDIMBA SEDE	**Diamentro do tubo de medicao:**
Código do furo：Man-12	**Diamentro do perfuracao:φ250mm,φ165mm**

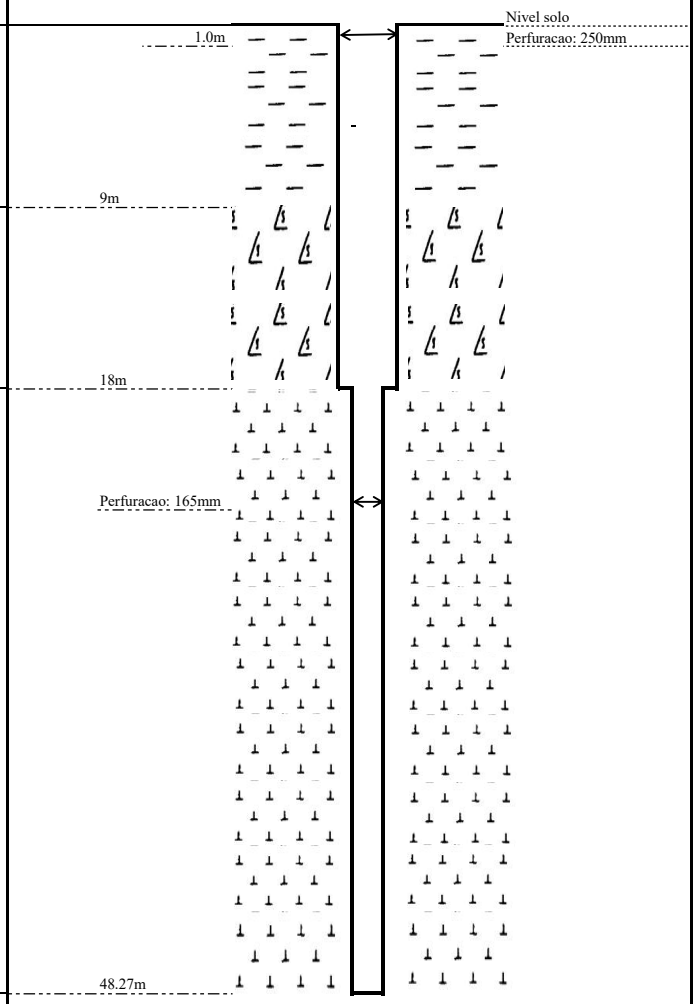
Condutividade:	**PH:**	**Temperatura:**	**Inclinacao:**

Volume estimado de agua: 0 .1 m³/h

Profundidade do estrado(m)		Taxa (m/min)	Esboco estratigrafico	FORMAÇÃO GEOLÓGICA
1m 2m 3m 4m 5m 6m 7m 8m 9m	1-9m	0.224m/min		Solo coeso vermelho
10m 11m 12m 13m 14m 15m 16m 17m 18m	10-18m	0.507m/min		Solo resistido marrom amarelo
19m 20m 21m 22m 23m 24m 25m 26m 27m 28m 29m 30m 31m 32m 33m 34m 35m 36m 37m 38m 39m 40m 41m 42m 43m 44m 45m 46m 47m 48.27m	19-48.27m	0.145m/min		Granodiorito cinza

DIAGRAMA DO FURO

Negativo



Pelo Empreiteiro :	**Pelo Fiscal:**
Pelo Perfurador :	**Data:**

資料 8-7 深井戸試掘調査の井戸データ一覧

国名	州	県	集落	プロジェクト内番号	登録井戸番号	緯度	経度	地表高度	座標取得	緯度経度の精度	井戸諸元																								
											井戸合否	不合格理由	水質基準合否	注釈	新規掘削/リハビリテーション	物理探査	掘削年月日	仕上げ孔	井戸掘削径	掘削流体	掘削深度	掘進率情報	水が出た深度情報	エアリフト揚水量	揚水基準合否	ケーシング							孔内水位測定		自然水位
																データの有無		ビットタイプ									挿入の有無	材質	サイズ	挿入深度	Secreen Depth		総スクリーン長	水位測定基準	測定基準高	
																															Top	Bottom				
						Deg Decimal	Deg Decimal	m									Completion date		mm		m	m/min	m	m3/h				mm	m	m	m	m		m	GL-m
Mozambique	Niassa	Majune	Malanga	Maj-1	-	-13.47553	36.12255	715	Borehole	3m	Negative	Dry	-	-	New	Present	16/Jul/2019	Wing, DTH	165	Air	40.00	1.7-0.09	Dry	Dry	No	No	-	-	-	-	-	-	-	-	-
Mozambique	Niassa	Majune	Malanga	Maj-2	-	-13.48015	36.11771	704	Borehole	3m	Positive	-	Positive	Re-check Pb, P	New	Present	22/Jul/2019	Tricone, DTH	350	Air, Mud	52.24	0.01-0.0.06	15, 25, 35	10.0	Yes	Yes	PVC	200	51.84	13.84	44.86	22.56	Casing Top	0.50	5.43
Mozambique	Niassa	Majune	Malanga	Maj-3	-	-13.48450	36.12275	704	Borehole	3m	Positive	-	Positive	Re-check P	New	Present	28/Jul/2019	Wing, DTH	250	Air, Mud	61.50	0.035-1.16	22, 26, 32, 46	5.0	Yes	Yes	PVC	150	60.83	19.50	53.47	22.64	Casing Top	0.50	6.10
Mozambique	Niassa	Muembe	Muembe	Mue-1	-	-13.09096	35.63214	1122	Borehole	3m	Negative	Dry	-	-	New	Present	23/Jul/2019	DTH	165	Air	34.20	0.35-0.59	Dry	Dry	No	No	-	-	-	-	-	-	-	-	-
Mozambique	Niassa	Muembe	Muembe	Mue-2	-	-13.08369	35.63721	1093	Borehole	3m	Negative	Dry	-	-	New	Present	24/Jul/2019	DTH	165	Air	45.00	0.22	Dry	Dry	No	No	-	-	-	-	-	-	-	-	-
Mozambique	Niassa	Muembe	Muembe	Mue-3	-	-13.09723	35.64936	1086	Borehole	3m	Positive	-	Positive	Re-check Pb, P	New	Present	02/Aug/2019	Wing, DTH	250-350	Air, Mud	71.00	0.08-0.59	32, 41, 48, 54, 60	5.0	Yes	Yes	PVC	150	68.87	60.63	61.76	19.81	Casing Top	0.50	10.55
Mozambique	Niassa	Muembe	Muembe	Mue-4	-	-13.08144	35.64578	1091	Borehole	3m	Positive	-	Positive	Re-check Pb, P	New	Present	05/Aug/2019	Tricone, DTH	250	Air, Mud	61.32	0.06-0.94	36, 53	2.0	Yes	Yes	PVC	150	60.64	35.08	54.96	17.04	Casing Top	0.50	12.33
Mozambique	Niassa	Mavago	Mavago	Mav-1	-	-12.57369	36.25631	803	Borehole	3m	Negative	Dry	-	-	New	Present	06/Aug/2019	Wing, DTH	165-250	Air	52.50	0.07-0.08	Dry	Dry	No	No	-	-	-	-	-	-	-	-	-
Mozambique	Niassa	Mavago	Mavago	Mav-2	-	-12.56338	36.26667	803	Borehole	3m	Negative	Low yield	-	high P, HN3	New	Present	10/Aug/2019	DTH	165-250	Air	51.50	0.06	16, 28	1.5	Yes, for handpump	Yes	PVC	150	43.25	27.60	38.92	11.32	Casing Top	0.50	7.53
Mozambique	Niassa	Mavago	Mavago	Mav-3	-	-12.55193	36.26109	803	Borehole	3m	Negative	Dry	-	-	New	Present	08/Aug/2019	DTH	165	Air	48.21	0.05-0.42	Dry	Dry	No	No	-	-	-	-	-	-	-	-	-
Mozambique	Niassa	Mavago	Mavago	Mav-4	-	-12.56932	36.27226	802	Borehole	3m	Negative	Dry	-	-	New	Present	11/Aug/2019	Wing, DTH	165-250	Air	51.25	0.11-0.29	Dry	Dry	No	No	-	-	-	-	-	-	-	-	-
Mozambique	Niassa	Mavago	Mavago	Mav-5	-	-12.55861	36.25904	847	Borehole	3m	Positive	-	Positive	Re-check NH3, P	New	Present	17/Aug/2019	Wing, DTH	250-350	Air	61.00	0.05-0.17	18, 29, 40, 49	1.5	Yes	Yes	PVC	150	60.04	16.25	53.04	28.30	Casing Top	0.50	0.30
Mozambique	Niassa	Ngauma	Massangulo	Mas-1	-	-13.91749	35.42193	1148	Borehole	3m	Negative	Low yield	-	-	New	Present	10/Aug/2019	DTH	165	Air	50.00	0.11-1.03	26	0.1	No	No	-	-	-	-	-	-	-	-	-
Mozambique	Niassa	Ngauma	Massangulo	Mas-2	-	-13.90536	35.42308	1144	Borehole	3m	Negative	Low yield	-	-	New	Present	07/Aug/2019	DTH	165	Air	70.00	0.12-0.36	39	0.4	No	No	-	-	-	-	-	-	-	-	-
Mozambique	Niassa	Ngauma	Massangulo	Mas-3	-	-13.91456	35.42286	1129	Borehole	3m	Negative	Low yield	-	-	New	Present	23/Sep/2019	DTH	165	Air	53.01	0.10-0.38	30	1.5	No	No	-	-	-	-	-	-	-	-	-
Mozambique	Niassa	Ngauma	Massangulo	Mas-4	-	-13.90656	35.42892	1102	Borehole	3m	Negative	Low yield	-	-	New	Present	26/Sep/2019	DTH	165	Air	53.00	0.11-0.77	22	1.3	No	No	-	-	-	-	-	-	-	-	-
Mozambique	Niassa	Mandimba	Mandimba	Man-1	-	-14.35752	35.68023	740	Borehole	3m	Positive	-	Positive	Re-check P	New	Present	23/Aug/2019	Wing, DTH	250-350	Air, Mud	52.32	0.03-0.07	29	8.0	Yes	Yes	PVC	150	51.71	27.80	47.61	16.98	Casing Top	0.50	10.17
Mozambique	Niassa	Mandimba	Mandimba	Man-2	-	-14.35554	35.68348	734	Borehole	3m	Negative	Low yield	-	-	New	Present	11/Aug/2019	DTH	165	Air	50.00	0.12-0.18	12	0.3	No	No	-	-	-	-	-	-	-	-	-
Mozambique	Niassa	Mandimba	Mandimba	Man-2(A)	-	-14.35674	35.68142	734	Borehole	3m	Positive	-	Positive	Re-check P	New	Present	16/Aug/2019	Wing, DTH	250	Air, Mud	65.28	0.03-0.38	41	5.0	Yes	Yes	PVC	150	64.66	40.52	60.33	16.98	Casing Top	0.50	10.17
Mozambique	Niassa	Mandimba	Mandimba	Man-7	-	-14.35996	35.66898	742	Borehole	3m	Negative	Low yield	-	-	New	Present	02/Sep/2019	Wing, DTH	250-350	Air, Mud	61.05	0.03-0.09	22	5.0	No	Yes	PVC	150	60.49	21.92	56.30	28.40	Casing Top	0.50	11.04
Mozambique	Niassa	Mandimba	Mandimba	Man-9	-	-14.36442	35.64844	759	Borehole	3m	Negative	Low yield	-	-	New	Present	08/Sep/2019	Wing, DTH	165-300	Air	43.00	0.02-0.11	23	1.0	No	No	-	-	-	-	-	-	-	-	-
Mozambique	Niassa	Mandimba	w	Man-10	-	-14.35968	35.67599	734	Borehole	3m	Positive	-	Positive	Re-check NH3, NO2	New	Present	20/Sep/2019	Tricone, DTH	250-350	Air, Mud	64.60	0.01-0.65	30, 49, 57	5.0	Yes	Yes	PVC	150	63.60	25.31	59.27	22.72	Casing Top	0.50	11.11
Mozambique	Niassa	Mandimba	Mandimba	Man-11	-	-14.36148	35.67680	735	Borehole	3m	Negative	-	-	-	New	Present	25/Aug/2019	Tricone, DTH	165-250	Air, Mud	40.00	0.05-0.34	28	0.1	No	No	-	-	-	-	-	-	-	-	-
Mozambique	Niassa	Mandimba	Mandimba	Man-12	-	-14.36581	35.65257	752	Borehole	3m	Negative	-	-	-	New	Present	06/Sep/2019	Wing, DTH	165-250	Air, Mud	48.27	0.15-0.51	18	0.1	No	No	-	-	-	-	-	-	-	-	-

資料 8-7 深井戸試掘調査の井戸データ一覧

国名	州	県	集落	プロジェクト内番号	揚水試験								水質試験																										
					揚水試験開始日	連続揚水試験					回復試験		分析の有無	色度		濁度		臭気	味	温度	pH	電気伝導度	蒸発残留物		全硬度		アンモニウム		鉄		フッ素		硝酸塩		亜硝酸塩		塩化物		アルカリ度	
						試験開始水位	揚水量	揚水時間	動水位	比湧出量	計測時間	回復水位		mgPt/l		UNT							TDS			NH_3		Fe		F		NO_3		NO_2		Cl-			
														符号	値	符号	値	値	値	値	値	値	符号	値	符号	値	符号	値	符号	値	符号	値	符号	値	符号	値	符号	値	符号	値
						m	m3/h	Hr	m	m3/h/m	Hr	m					NTU			Deg. C		µS/cm		mg/L		mg/L		mg/L		mg/L		mg/L		mg/L		mg/L		mg/L	
Mozambique	Niassa	Majune	Malanga	Maj-1	-	-	-	-	-	-	-	-	Present	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Mozambique	Niassa	Majune	Malanga	Maj-2	29/Jul/2019	5.93	7.5	24.0	4.16	1.80	6.0	6.06	Present	-	0.00	-	0.00	Nill (by supervisor)	Nill (by supervisor)	25.00	6.62	61.53	-	30.72	-	10.00	-	0.00	-	0.02	-	0.27	-	<0.02	-	<0.004	-	21.00	-	31.40
Mozambique	Niassa	Majune	Malanga	Maj-3	30/Jul/2019	6.60	4.5	24.0	11.62	0.39	5.0	6.73	Present	-	5.00	-	0.18	Nill (by supervisor)	Nill (by supervisor)	24.00	6.60	137.30	-	68.61	-	25.00	-	0.94	-	0.01	-	1.20	-	<0.02	-	<0.004	-	62.00	-	86.80
Mozambique	Niassa	Muembe	Muembe	Mue-1	-	-	-	-	-	-	-	-	Present	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Mozambique	Niassa	Muembe	Muembe	Mue-2	-	-	-	-	-	-	-	-	Present	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Mozambique	Niassa	Muembe	Muembe	Mue-3	04/Aug/2019	10.93	9.0	24.0	12.74	0.71	6.0	10.93	Present	-	0.00	-	0.72	Nill (by supervisor)	Nill (by supervisor)	23.00	6.90	138.50	-	69.25	-	40.00	-	0.72	-	0.01	-	0.36	-	<0.02	-	<0.004	-	5.00	-	75.20
Mozambique	Niassa	Muembe	Muembe	Mue-4	06/Aug/2019	12.83	3.0	24.0	18.11	0.17	6.0	13.33	Present	-	5.00	-	0.12	Nill (by supervisor)	Nill (by supervisor)	25.00	6.58	110.20	-	55.05	-	35.00	-	0.24	-	0.02	-	0.37	-	<0.02	-	<0.004	-	5.00	-	85.10
Mozambique	Niassa	Mavago	Mavago	Mav-1	-	-	-	-	-	-	-	-	Present	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Mozambique	Niassa	Mavago	Mavago	Mav-2	11/Aug/2019	8.03	0.8	9.0	22.45	0.04	6.0	26.93	Present	-	0.00	-	0.07	Nill (by supervisor)	Nill (by supervisor)	21.00	7.59	249.50	-	124.90	-	75.00	-	3.36	-	0.00	-	0.17	-	-	-	-	-	9.00	-	-
Mozambique	Niassa	Mavago	Mavago	Mav-3	-	-	-	-	-	-	-	-	Present	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Mozambique	Niassa	Mavago	Mavago	Mav-4	-	-	-	-	-	-	-	-	Present	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Mozambique	Niassa	Mavago	Mavago	Mav-5	21/Aug/2019	0.80	9.9	24.0	21.13	0.47	6.0	4.34	Present	-	5.00	-	0.43	Nill (by supervisor)	Nill (by supervisor)	19.90	7.00	87.58	-	43.75	-	20.00	-	1.53	-	0.02	-	0.60	-	-	-	-	-	2.00	-	
Mozambique	Niassa	Ngauma	Massangulo	Mas-1	-	-	-	-	-	-	-	-	Present	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Mozambique	Niassa	Ngauma	Massangulo	Mas-2	-	-	-	-	-	-	-	-	Present	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Mozambique	Niassa	Ngauma	Massangulo	Mas-3	-	-	-	-	-	-	-	-	Present	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Mozambique	Niassa	Ngauma	Massangulo	Mas-4	-	-	-	-	-	-	-	-	Present	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Mozambique	Niassa	Mandimba	Mandimba	Man-1	29/Aug/2019	10.74	7.5	24.0	17.25	0.43	6.0	11.18	Present	-	5.00	-	0.00	Nill	Nill	22.30	6.53	176.60	-	88.35	-	45.00	-	1.44	-	0.01	-	0.39	-	4.40	-	0.66	-	3.00	-	30.00
Mozambique	Niassa	Mandimba	Mandimba	Man-2	-	-	-	-	-	-	-	-	Present	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Mozambique	Niassa	Mandimba	Mandimba	Man-2(A)	26/Aug/2019	10.68	5.2	24.0	25.09	0.21	5.0	10.73	Present	-	0.00	-	1.00	Nill (by supervisor)	Nill (by supervisor)	21.00	6.67	266.90	-	133.40	-	65.00	-	1.44	-	0.00	-	0.56	-		-		-	2.00	-	
Mozambique	Niassa	Mandimba	Mandimba	Man-7	02/Sep/2019	12.00	1.0	24.0	11.84	0.08	6.0	12.98	Present	-	0.00	-	0.00	Nill	Nill	22.00	7.43	350.10	-	175.00	-	130.00	-	2.16	-	0.01	-	0.50	-	4.40	-	0.66	-	6.00	-	31.00
Mozambique	Niassa	Mandimba	Mandimba	Man-9	-	-	-	-	-	-	-	-	Present	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Mozambique	Niassa	Mandimba	w	Man-10	20/Sep/2019	11.65	5.0	24.0	16.75	0.30	5.0	11.64	Present	-	5.00	-	0.00	Nill	Nill	22.00	7.40	580.60	-	290.30	-	195.00	-	3.12	-	0.01	-	0.01	-	4.00	-	0.66	-	6.00	-	30.00
Mozambique	Niassa	Mandimba	Mandimba	Man-11	-	-	-	-	-	-	-	-	Present	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Mozambique	Niassa	Mandimba	Mandimba	Man-12	-	-	-	-	-	-	-	-	Present	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Estudo Preparatório
do
Projecto de Construção de Sistemas de Abastecimento de Água Rural na Província do Niassa
República de Moçambique

TERMO DE ACORDO E COMPROMISSO

O presente Termo de Acordo e Compromisso serve como um acordo para a entrega da responsabilidade para manutenção e proteção do(s) furo(s) teste(s) construídos entre Julho a Setembro de 2019, no âmbito do "Estudo Preparatório do Projecto de Construção de Sistemas de Abastecimento de Água Rural na Província do Niassa, República de Moçambique" da Equipa do Estudo da JICA à parte Moçambicana.

A Direcção Provincial das Obras Públicas, Habitação e Recursos Hídricos do Niassa (DPOPHRH-Niassa) e o seguinte Governo Distrital são responsáveis pela manutenção e proteção dos furos testes até o início da construção das obras do Projecto para que estes furos sejam utilizados como furo de produção.

Nome da localidade-alvo:	Vila Distrital de MAVAGO
Identificação do Furo:	Mav-5
Coordenada do Furo:	-12.558608 36.259046

25 de Novembro de 2019

Américo J. Chivale	Adélia Alberto	Shoichi Yokogi
Director Provincial	Administradora	Chefe da Equipa de
DPOPHRH-Niassa	Distrito de Mavago	Estudo da JICA

REPÚBLICA DE MOÇAMBIQUE GOVERNO DA PROVÍNCIA DO NIASSA DIRECÇÃO PROVINCIAL DAS OBRAS PÚBLICAS, HABITAÇÃO E RECURSOS HÍDRICOS LICHINGA

REPÚBLICA DE MOÇAMBIQUE PROVÍNCIA DO NIASSA GOVERNO DO DISTRITO DE MAVAGO MAVAGO

Estudo Preparatório
do
Projecto de Construção de Sistemas de Abastecimento de Água Rural na Província do Niassa
República de Moçambique

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Nome da localidade-alvo:	Vila Distrital de MUEMBE	
Identificação do Furo:	Mue-3	Mue-4
Coordenada do Furo:	-13.097222 35.649328	-13.081439 35.645781

25 de Novembro de 2019

Américo Jeremias Chivale Director Provincial DPOPHRH-Niassa	Antonio Benabe Cajica Administrador Distrito de Muembe	Shoichi Yokogi Chefe da Equipa de Estudo da JICA

Estudo Preparatório
do
Projecto de Construção de Sistemas de Abastecimento de Água Rural na Província do Niassa
República de Moçambique

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A Direcção Provincial das Obras Públicas, Habitação e Recursos Hídricos do Niassa (DPOPHRH-Niassa) e o seguinte Governo Distrital são responsáveis pela manutenção e proteção dos furos testes até o início da construção das obras do Projecto para que estes furos sejam utilizados como furo de produção.

Nome da localidade-alvo:	Vila Distrital de MAJUNE	
Identificação dos Furos:	Maj-2	Maj-3
Coordenada dos Furos:	-13.480153 36.117714	-13.484512 36.122744

25 de Novembro de 2019

Américo Jeremias Chivale
Director Provincial
DPOPHRH-Niassa

Antonio Joaquim Guido
Administrador
Distrito de Majune

Shoichi Yokogi
Chefe da Equipa de
Estudo da JICA

Estudo Preparatório

do

Projecto de Construção de Sistemas de Abastecimento de Água Rural na Província do Niassa

República de Moçambique

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A Direcção Provincial das Obras Públicas, Habitação e Recursos Hídricos do Niassa (DPOPHRH-Niassa) e o seguinte Governo Municipal são responsáveis pela manutenção e proteção dos furos testes até o início da construção das obras do Projecto para que estes furos sejam utilizados como furo de produção.

Nome da localidade-alvo:	Município de MANDIMBA			
Identificação do Furo:	Man-1	Man-2(A)	Man-7	Man-10
Coordenada do Furo:	-14.357528 35.680230	-14.356741 35.681457	-14.359939 35.668973	-14.359679 35.675993

Direcção Prov: das Obras Públicas, Habitação e recursos Hídricos do Niassa
Entrada N.º 51 Proc,
Data 05 / 02 / 2020
Rubrica.

25 de Novembro de 2019

Américo Jeremias Chivale Director Provincial DPOPHRH-Niassa	**João Stande** Presidente do Município Município de Mandimba	Shoichi Yokogi Chefe da Equipa de Estudo da JICA

Project Monitoring Report
on
THE PROJECT FOR CONSTRUCTION OF RURAL WATER SUPPLY FACILITY IN NIASSA PROVINCE, REPUBLIC OF MOZAMBIQUE
Grant Agreement No. XXXXXXX
2020, November

Organizational Information

Signer of the G/A (Recipient)	Person in Charge (Designation) Contacts Address: Phone/FAX: Email:
Executing Agency	**National Directorate of Water Supply and Sanitation (DNAAS)** Person in Charge Mr. Nilton Sérgio Rebelo Trindade, National Director Contacts Address: 162 Rua da Imprensa, Maputo, Mozambique Phone:+258 21323269/21430203 Email: nilton_trindade@yahoo.com
Line Ministry	**Ministry of Public Works, Housing and Water Resources** Person in Charge Contacts Address: Av. Karl Marx N.º 606, Maputo, Mozambique Phone/FAX: +258-2132-1366 Email:

General Information:

Project Title	The Project for Construction of Rural Water Supply Facility in Niassa Province, Republic of Mozambique
E/N	Signed date: Duration:
G/A	Signed date: Duration:
Source of Finance	Government of Japan: Not exceeding JPY____. Government of (the Republic of Mozambique: JPY____.

1: Project Description

1-1 Project Objective

In order to contribute to achieve universal and equitable access to safe and affordable drinking water, the Project will provide water supply facilities in four districts of Niassa Province. Specifically, construction of 4 piped water supply facilities, 100 boreholes fitted with hand pump, procurement of equipment and materials such as pipes, equipment for office and monitoring, and finally, *soft component activities* to improve the sustainability of the facilities.

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

Higher-level objectives:
It is expected that the risk of water-related diseases such as diarrhea can be reduced by improving access to improved drinking water sources and improving water quality. In particular, ensuring safe water access to children under the age of five, who are prone to be affected with waterborne diseases, can prevent the occurrence of diarrhea that reduces the ability to absorb nutrients and contribute to long-term improvement in nutritional status. In addition, by reducing the time, physical and energy burden of fetching water from many women and children who are responsible for collecting water every day, the opportunity for children to attend school and women to participate in economic activities can be expected to increase.

Situation of the target groups:
According to the results of the social condition survey, in 65% of the project candidate sites, there is no safe water source, and the population depends only on unprotected shallow wells or from streams. This situation is reflected in the question: "What do you especially want to improve in your living condition?". 84% of all surveyed households give as first priority the improvement of water supply services, followed by electrical services and medical services at 4% each.

1-3 Indicators for measurement of "Effectiveness"

Quantitative indicators to measure the attainment of project objectives		
Indicators	Original (Yr 2019)	Target (Yr 2027)
Water Supply Population (person)	21,600	86,314
Water Supply Amount (m^3/day)	456	2,289

Qualitative indicators to measure the attainment of project objectives

- Reduction of time required for fetching water (including waiting time) (corresponding to SDGs 3.9.2)
- Reduction of diarrheal disease (corresponding to SDGs 3.9.2)
- Reduction of stunting in children (corresponding to SDGs 2.2.1)

2: Details of the Project

2-1 Location

Components	Original *(proposed in the outline design)*	Actual
1. Construction of piped water supply facilities, borehole fitted with hand pump and soft component activities	• Piped water scheme: 4 town in 4 districts • Borehole fitted with hand pump: 100 units in 4 districts	

2-2 Scope of the work

Components	Original* *(proposed in the outline design)*	Actual*
1. Construction of pumping system	N =17 (1 existing in Mavago)	
2. Construction of Water Tanks	N = 5 (4 elevated and 1 ground tank)	
3. Machinery and Management Building	N=4 (Management) N=5 (Machinery house)	
4. Construction of Pipeline (Transmission and Distribution)	About 131.9km	
5. Construction of Public Fountain	N = 24	
6. House Connection	N=950 (installation) N=1,195 (Procurement)	
7. Borehole fitted with hand pump	N=100	

Reasons for modification of scope (if any).

2-3 Implementation Schedule

Items	Original		Actual
	(proposed in the outline design)	*(at the time of signing the Grant Agreement)*	
Government Bond			
Cabinet Approval	2020/12		
E/N	2021/01		
G/A	2021/01		
Consultant Contract	2021/02		
Detailed Design	2021/02- 2021/07		
Tender Notice	2020/07		
Tender	2021/10		
Contractor Agreement	2021/11		
Construction of water supply systems	2021/12- 2023/6		
Check-out of Completion of Construction work	2023/06		
Soft component	2021/03 – 2023/06		

Items	Original		Actual
	(proposed in the outline design)	*(at the time of signing the Grant Agreement)*	
Defect Liability Period	2024/06		
Project Completion	2024/06		

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 (Confidential until the Bidding)

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. Construction			
2. Software Component			
3. Consultant Services			
4. Contingencies expenses			
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 Yen)	
Original *(proposed in the outline design)*	Actual *(in case of any modification)*	Original[1),2)] *(proposed in the outline design)*	Actual
1. To open bank account (Banking Arrangement（B/A）, and bear the Payment Commission to a bank in Japan		2,110	
2. To bear the followings: 1) Advising commission of A/P 2) Payment commission for A/P		20	
3. To accompany the field work during Detailed Design at target sites		803	

Components		Cost (1,000 Yen)	
Original *(proposed in the outline design)*	Actual *(in case of any modification)*	Original[1),2)] *(proposed in the outline design)*	Actual
4. To accompany the geophysical survey team during the Detailed Design survey		1,353	
5. Site Transfer to the Contractor (Hand pump site)		211	
6. Site Transfer to the Contractor (Piped Water Scheme)		254	
7. To accompany the geophysical team at alternative sites		423	
8. Custom duties, taxes and others 1) 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 by its designated authority without using the Grant. 2) To bear the Personal Income Tax for Japanese Nationals and/or physical persons of third countries (main contractors, subcontractors, suppliers and consultants) 3) To bear the IRPC (Income Tax on Legal Entity) for Japanese companies (main contractors, subcontractors, suppliers and consultants) (If requires)		19,283	
9. To assign supervisor during the construction period 1) To accompany in the supervision during the construction work		1,966	
2) Inspection work for hand-over (borehole with hand pump)		423	
3) Inspection work for hand-over of piped water scheme		254	
10. To assign counterparts for the soft-component activities		5,095	
Total		32,194	

Note: 1) Date of estimation: September 2019
2) Exchange rate: 1 MZN = 1.7614 JPY

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: National Directorate for Water Supply and Sanitation (DNAAS) Role: Policy making and regulation in rural water supply. Sector planning, project supervision and monitoring of water supply construction/rehabilitation Financial situation: The budget is estimated to be around MZN72.43 million annually (Average of 2017 and 2018). Institutional and organizational arrangement (organogram): DNAAS consists of four departments (Water, Sanitation, Planning and Finance/Administration). Human resources (number and ability of staff): Number of staff is about 40, where half are highly skilled staffs, with extensive experience in project planning, monitoring, coordination between donors and stakeholders at national level.
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 spare parts, etc.)

Original *(at the time of outline design)* a. <u>Piped water supply scheme:</u> according to the rule of Mozambican Government, the piped water supply facilities to be constructed will belong to AIAS (Administration of Water and Sanitation Infrastructure). O&M of the facilities will be done by a private operator which will be selected by AIAS and sign a concession contract for the purpose. b. <u>Borehole with hand pump: Water and Sanitation</u>Committee (CAS) is responsible for operation and maintenance of water supply facilities, and each District is responsible for the monitoring of the facilities. CAS is composed of approximately 12 members including president, vice president, secretary, accountant, maintenance group (several). For the selection of members, the villagers are encouraged to include 50% women and 50% men. The maintenance group will be in charge of daily cleaning of the pump area and small repairing works of the handpump. Also, the project will train some numbers of hand pump mechanics, who can assist the villagers in case of repairing work that the villagers can not perform.
Actual *(PMR)*

3-2 Budgetary Arrangement

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

Original *(at the time of outline design)* a. Piped water supply scheme: Water tariff for piped water supply scheme is based on volume of water consumption, and it is regulated by AURA (Water Regulatory Authority) at national level. The latest tariff is MZN1.0/20Lit in public faucet, and MZN36.00/m^3 in house connection (or yard tap). All the water users for house connection shall make a contract and a water meter shall be installed. b. Borehole with handpump: the tariff will be decided after discussion in each village. Based on the estimation calculated in the previously implemented technical cooperation by JICA in Niassa Province (PROSUAS), the maintenance cost per family/month (average of four districts) is MZN24.67. And, according to the result of social condition survey, the amount of willingness to pay per family/month is MZN64.25.
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):
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.

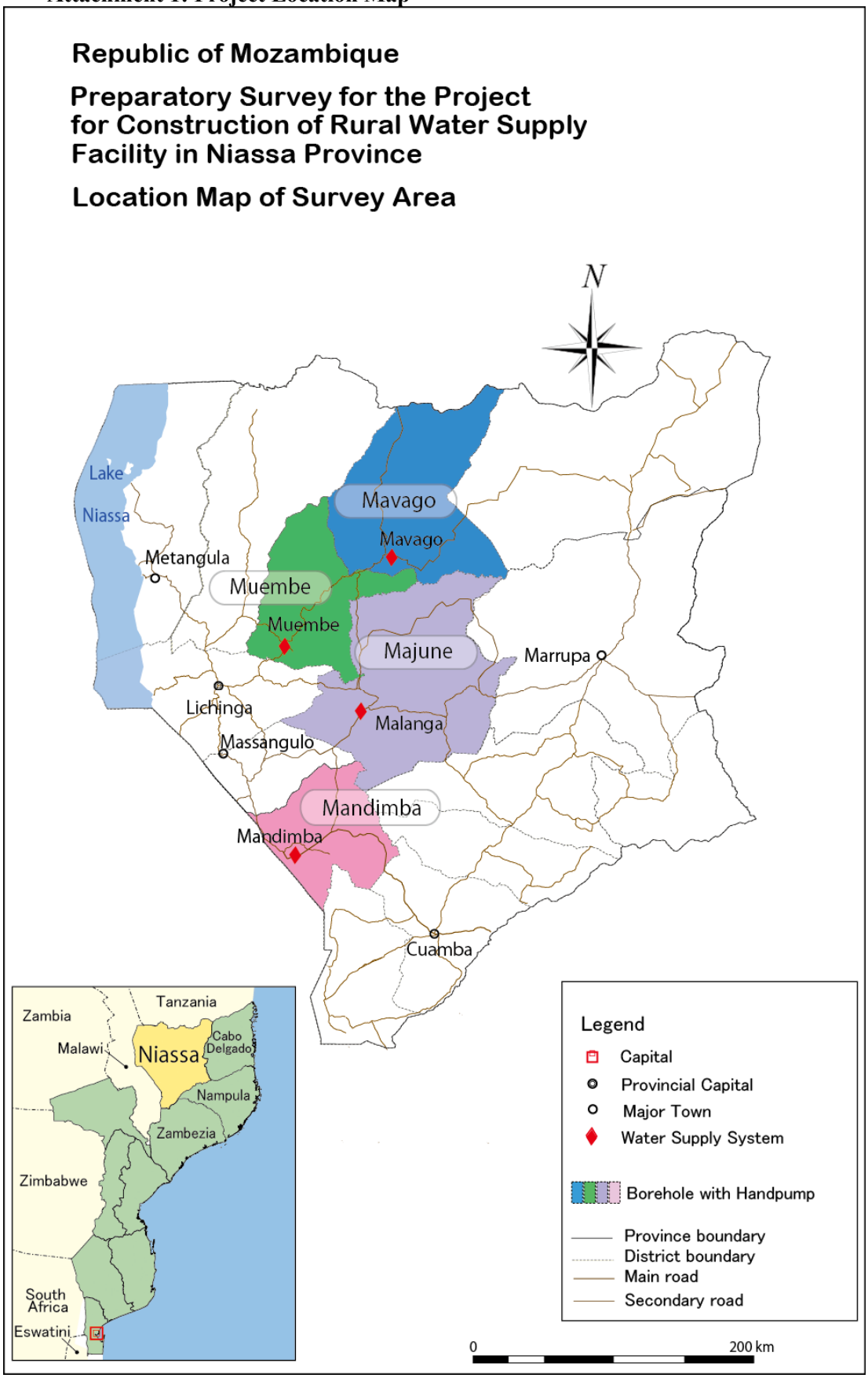
Attachment

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)

Attachment 1: Project Location Map



Attachment 2: Specific obligations of the Recipient which will not be funded with the Grant

The following tables show obligations of the Mozambican side by category.

【Before Bidding】

No.	Items	Deadline	In charge
1	To open bank account (Banking Arrangement（B/A）), and bear the Payment Commission to a bank in Japan	Within 1 month after the signing of the G/A	DNAAS
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	DNAAS
3	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 2) Payment commission for A/P	1) Within 1 month after the signing of the contract 2) Every payment	DNAAS
4	To secure and clear lands 1) Site for piped water supply scheme 2) Site for the boreholes with hand pumps	Before notice of the bidding document	SDPI
	To clear and maintain access road to the sites (if required)	Before notice of the bidding document	DNAAS
	To secure land necessary for the construction of water supply scheme such as pumping station, elevated water tank, water pipes and public tap stand etc	Before notice of the bidding document	DNAAS
	To secure stock yards and store to maintain construction materials	Before notice of the bidding document	DPOP, SDPI
	To obtain the necessary permit for the implementation of the Project from the concerned organization (road crossing of pipeline, and others)	Before notice of the bidding document	DPOP, SDPI
5	To obtain the planning, zoning, building permit	Before notice of the bidding documents	DNAAS
6	To assign counterparts for the Survey Team during Detail Design survey	Soon after starting detail design survey	DNAAS
	To accompany the field work during Detailed Design at target sites		SDPI
	To accompany the geophysical survey team during the Detailed Design survey		SDPI
	Site Transfer to the Contractor (Hand pump site)		SDPI
	Site Transfer to the Contractor (Piped Water Scheme)		AIAS DSI-AS, SDPI
	To accompany the geophysical team at alternative sites		SDPI
7	To submit Project Monitoring Report (with the result of Detail Design)	before preparation of bidding document(s)	DNAAS

【During the Project Implementation】

No.	Items	Deadline	In charge
1	To issue A/P to a bank in Japan (the Agent Bank) for the payment to the contractors	Within 1 month after contract(s) signing	DNAAS
2	To bear the following commissions to a bank of Japan for the banking services based upon the B/A		DNAAS
	1) Advising commission of A/P	1) Within 1 month after the singing of the contract(s)	DNAAS
	2) Payment commission for A/P	2)Every payment	DNAAS
3	To ensure prompt customs clearance and assist the Contractor(s) with internal transportation in recipient country	During the project	DNAAS
4	1) To accord Japanese nationals and/or physical persons of third countries (main contractors, subcontractors, supplies and consultants) 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. 2) The Recipient implements this project in accordance with Regulation of the Mechanisms and Procedures of Employment of foreign Workers stipulated in article 12 “Investment Projects” on the decree No. 37/2016, August 31, 2016. Working status for the Project shall be preceded as a contract for the investment Project approved by the Recipient Government stipulated in Article 12 on the degree No. 37/2016, August 31, 2016. The possible number of Japanese nationals and/or physical persons of third countries are 15* persons while the number of persons of Recipient country is 300*. * the Number will be decided by November 2021. 3) If the above number of Japanese nationals and/or physical persons of third countries exceed than the Project shall apply for Working Permit Authorization Regime stipulated in article 16, 17, 18 and 19 on the degree No. 37/2016, August 31, 2016.	During the Project	DNAAS
5	To accord Japanese nationals and/or physical persons of third countries whose services may be required in connection with the supply of the products and services under the verified contract such as facilities as may be necessary for their entry into the recipient country and stay therein for the performance of their work,and move access the states within the country.	During the project	DNAAS
6	1) 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 by its designated authority without using the Grant.	During the project	DNAAS
	2)To bear the Personal Income Tax for Japanese Nationals and/or physical persons of third countries (main contractors, subcontractors, suppliers and consultants)		
	3)To bear the IRPC (Income Tax on Legal Entity) for Japanese companies (main contractors, subcontractors, suppliers and consultants) (If requires)		

7	To bear all the expenses, other than those covered by the Grant, necessary for the implementation of the Project	During the project	DNAAS
8	To take measure necessary for security and safety of the Project - maintaining the safety of workers and the general public by thorough implementation of safety measures and immediate action in the case of accident - traffic control around the site(s) and on transportation routes of construction materials installation of gates and fences around the site(s)	during the construction	DNAAS
9	To submit the Project Monitoring Report	Every month	DNAAS
10	To submit Project Monitoring Report (final)	Within one month after signing of Certificate of Completion for the works under the contract(s)	DNAAS
11	To submit a report concerning completion of the Project	Within six months after completion of the Project	DNAAS
12	To provide facilities for distribution of electricity, water supply and drainage and other incidental facilities necessary for the implementation of the Project outside the site(s)	3 months before completion of the construction	DNAAS
13	To assign supervisor during the construction period	During the project	DNAAS
	1) To accompany in the supervision during the construction work	During the project	DNAAS
	2)Inspection work for hand-over (borehole with hand pump)	During the project	DNAAS SDPI
	3) Inspection work for hand-over of piped water scheme	During the project	DNAAS AIAS
14	To assign counterparts for the soft-component activities	During the project	DNAAS
15	To conduct public relations activities in both national level and state level in Mozambique by utilizing the occasion of the handover ceremony of the facilities.	During the project	DNAAS

【After Completion of the Project】

NO	Items	Deadline	In charge
1	To maintain and use properly and effectively the facilities constructed and equipment provided under the Grant Aid 1) Monitor the payment of maintenance cost by the local beneficiaries 2) Operation and maintenance structure 3) Routine monitoring/Periodic inspection	After completion of the construction	DNAAS AIAS SDPI
2	To submit monitoring data related to evaluation indicators as attachment of Project Monitoring Report.	Within one month after each fiscal year up to 2027	DNAAS

Attachment 6: Monitoring sheet on price of specified materials (Quarterly)

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	6th
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%）	