

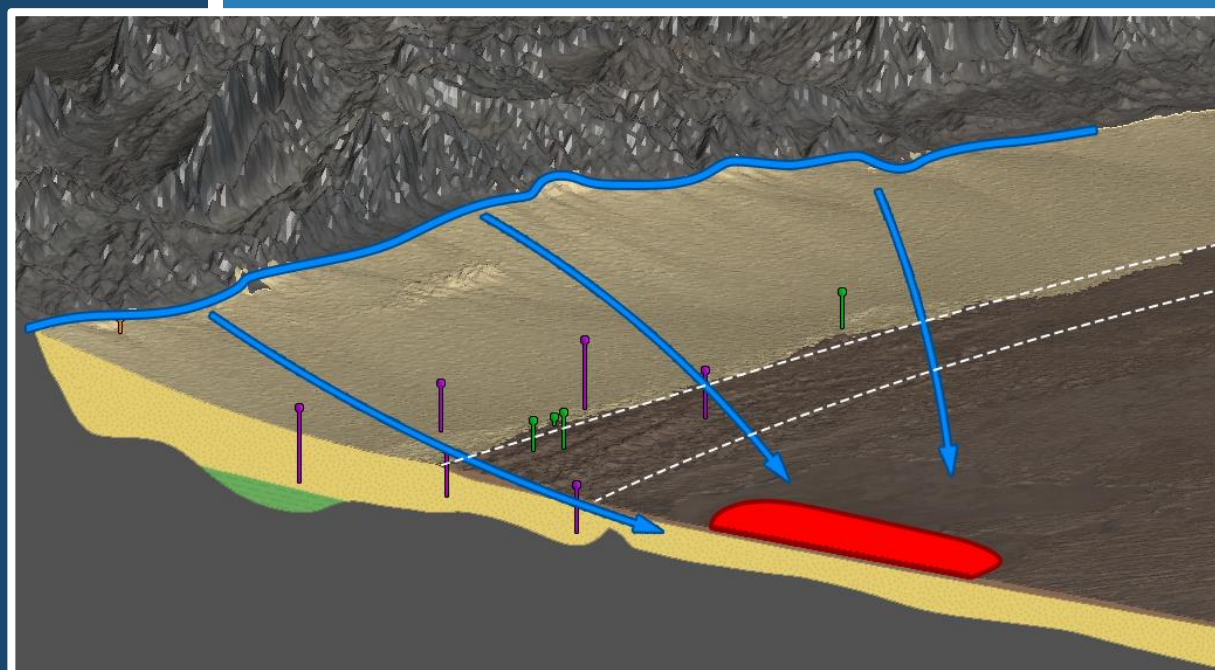


Hagler Bailly Pakistan



DIGBY WELLS
ENVIRONMENTAL

Appendix N: Groundwater Conceptualisation Report (Water Supply)



Reko Diq Mining Company Fan Sediments Conceptual Model Translation Report

May 2024
Rev A

Table of Contents

1. Executive Summary	3
2. Introduction	4
2.1 Background	4
2.2 Objectives.....	4
3. Project Setting.....	5
4. Stage 1 Modelling (2023)	7
4.1 Inputs	7
4.1.0 Reko Diq Hydrogeology Feasibility Study (SMEC, 2009)	7
4.2 Assumptions.....	11
4.3 Conceptual Model.....	11
4.4 LeapFrog Translation.....	12
5. Stage 2 Modelling (2024)	16
5.1 Inputs	16
5.1.0 2023 Hydrocensus (HBP, 2023).....	16
5.1.1 2024 Hydrogeological Report (SMEC, 2024a)	18
5.1.2 2024 Geophysical Report (SMEC, 2024b)	22
5.1.3 2024 Remote Sensing Assessment (Darkwater, 2024)	23
5.2 Assumptions.....	27
5.3 Conceptual Model.....	28
5.4 LeapFrog Translation.....	29
6. Stage 2 Numerical Modelling (2024)	39
7. Discussion.....	42
7.1 Uncertainties.....	42
8. References.....	45

Tables

Table 4-1: Summary of project hydrogeological test holes in the Fan Sediments NOC, 2007 to 2008 (Derived from SMEC, 2024a)	10
Table 5-1: Summary of project hydrogeological test holes in the Fan Sediments NOC, 2023 to 2024 (Derived from SMEC, 2024a)	22

Figures

Figure 1: Overview of the Fan Sediments Investigation Area and the Sistan Basin.....	6
--	---

Figure 2: Drilling Completed in the Baghicha NOC and surrounding areas during 2009.....	8
Figure 3: Groundwater Measurements in Feasibility Study Drilling, 2009.....	9
Figure 4: Stage 1 Conceptual Model Schematic	13
Figure 5: Inputs used when constructing the Stage 1 Geological Model.....	14
Figure 6: Saturated Thickness of Undifferentiated Sediments, Stage 1 Model	15
Figure 7: Hydrocensus Points (HBP, 2023).....	17
Figure 8: Fan Sediments Drilling Completed in 2023/24 (SMEC, 2024a)	20
Figure 9: Interpreted groundwater head contours - January 2024 Monitoring (SMEC, 2024a)	21
Figure 10: Summary map of the distribution of the data points and their sources which were applied for the gridding of the model surface (SMEC, 2024b).....	24
Figure 11: Modelled base of aquifer meters above mean sea level (SMEC, 2024b).....	25
Figure 12: Helmand River Dam Surface Water Extent and Helmand Catchment Precipitation Over Time (1984 - Present) (Darkwater, 2024).....	26
Figure 13: Updated Fan Sediments Conceptual Cross-section (SMEC, 2024a).....	31
Figure 14: Fan Sediments Isometric Conceptual Model Diagram.....	32
Figure 15: Hydraulic Conductivity Zoning (SMEC, 2024a).....	33
Figure 16: Specific Yield Zoning (SMEC, 2024a)	34
Figure 17: Fan Sediments Stage 2 Model - Confining Clay Layer Thickness	35
Figure 18: Fan Sediments Stage 2 Model - Sediments Saturated Thickness	36
Figure 19: Fan Sediments Stage 2 Model - Consolidated Sediments Thickness.....	37
Figure 20: Fan Sediments Stage 2 Model - Basement Elevation.....	38
Figure 21: Confined Aquifer Depressurisation and Recovery at Imtiaz Bore (GWC, 2024).....	40
Figure 22: Predicted P50 Drawdown in the Fan Sediments Aquifer at the End of Water Supply Abstraction (GWC, 2024)	41
Figure 23: Comparison Between Stage 1 and Stage 2 Conceptual Models - Cross-section.....	43

Appendices

1. Executive Summary

Two stages of hydrogeological conceptualisation, geological model construction, and subsequent numerical modelling have been performed for the Fan Sediments groundwater system. Stage 1 was undertaken prior to commencement of the most recent fieldwork and relied solely on inputs from hydrogeological investigations completed in 2009. Stage 2 incorporated hydrogeological, geophysical, and environmental inputs from investigations completed in 2023 and 2024.

The additional works completed as inputs to the Stage 2 geological modelling and subsequent numerical groundwater modelling have significantly changed the conceptualisation of the Fan Sediments aquifer. These works have addressed a number of key assumptions that were required during construction of the Stage 1 geological model.

The numerical modelling adopted a stochastic approach endorsed by the Groundwater Modelling Decision Support Initiative (GMDSI). The GMDSI approach enables assessment of hundreds of unique hydraulic-parameter distributions capable of reproducing the same observation data, in contrast to deterministic, single-model methods used historically. These outputs describe a statistical distribution of values (e.g., groundwater drawdown or abstraction volumes) across hundreds of different, calibrated modelling-runs. The statistical analysis of these values can be used to identify areas of uncertainty, aligning with the conservative, risk-based approach employed during conceptualisation and geological model construction.

Based upon the current hydrogeological conceptualisation and results from the associated numerical groundwater modelling, the Reko Diq Project life-of-mine (LOM) raw water demand can be met from a borefield established within the Fan Sediments (Baghicha) NOC. Abstraction will result in progressive water level decline within the Fan Sediments groundwater system, with associated propagation of drawdown beyond the borefield area.

Increases in aquifer thickness and the lateral extension of the aquifer into Afghanistan has significantly increased the estimated volume of groundwater stored within the Fan Sediments aquifer. However, definition of groundwater flows towards the Afghanistan border introduces potential transboundary drawdown impacts that will need to be managed during operation of the proposed Baghicha Borefield.

Conceptual hydrogeological outputs and subsequent geological model construction have allowed the creation of a probabilistic numerical modelling tool by which to assess the Fan Sediments groundwater system. This tool may be used to perform additional works, such as borefield optimization, or assessing future abstraction scenarios. The geological model and underlying numerical model may continue to be revised with inputs from further investigations and early works.

2. Introduction

2.1 Background

Darkwater Consulting Pty Ltd have been engaged by Barrick Gold Corporation (The Client) since October 2022, on an ongoing basis, to provide hydrogeological support to the Reko Diq Copper-Gold Project (The Project). The Project is held by Reko Diq Mining Company (RDMC), a wholly owned subsidiary of The Client.

As part of this ongoing support, two numerical groundwater modelling exercises were performed for the Fan Sediments groundwater system. Conceptual geological models of the groundwater investigation area were constructed using LeapFrog Geo as input to these numerical modelling exercises.

The first conceptual model (Stage 1) was completed using technical inputs from historical drilling performed from 2007 to 2009. The second (Stage 2), was completed using updated geophysical and hydrogeological investigation inputs collected in 2023 and 2024.

2.2 Objectives

This document describes the technical inputs and methodology by which the two conceptual geological models have been constructed. This includes:

- Data used as technical inputs in the hydrogeological conceptualisation and model construction;
- The translation of technical inputs to development of the conceptual model;
- Hydrogeological assumptions required in absence of data; and
- The methodology by which the geological models were constructed.

Outstanding uncertainties relating to the Stage 2 geological model are discussed.

3. Project Setting

The project setting as described in the Fan Sediments Hydrogeological Factual and Interpretive Report (SMEC, 2024a) is provided below. The location of the Fan Sediments investigation area relative to the Sistan Basin is provided in Figure 1.

The 'Fan Sediments' piedmont slope or plane, north of the Mirjawa Hills, is located on the southern periphery of the Sistan Basin. The majority of the Sistan Basin is located in Afghanistan. The terminology 'Fan Sediments' is derived from the extensive occurrence of elevated colluvial fan deposits along the northern edge of the Mirjawa Hills, west of the Saindak Mine. These hills are up to 15 kilometres wide (north to south) to the Iran border and greater than 100 kilometres (south-east to north-west) in length. The unconsolidated colluvial fans, sourced from the Mirjawa Hills, extend over 35 km northwards towards Afghanistan and Iran (north-west) and are part of the Helmand River Valley. The regional extent of sediment, hydraulic interconnection, and aquifer characteristics of the aquifers in the neighboring countries are unknown.

After rainfall, volumes of surface water may drain northwards out of the hills onto the colluvial fans.

The Helmand River is the longest river in Afghanistan and is the primary watershed of the Sistan Basin. This basin is a large, closed inland system. The Gaud-i-Zirreh, an intermittent hypersaline lake, the lowest topographic zone of the basin, collects the overflow from the wetlands in Iran, and in case of extreme floods direct from the Helmand River. The Gaud-i-Zirreh while being the terminus for surface flows in the Helmand Basin is also the groundwater discharge point for the Fan Sediments.

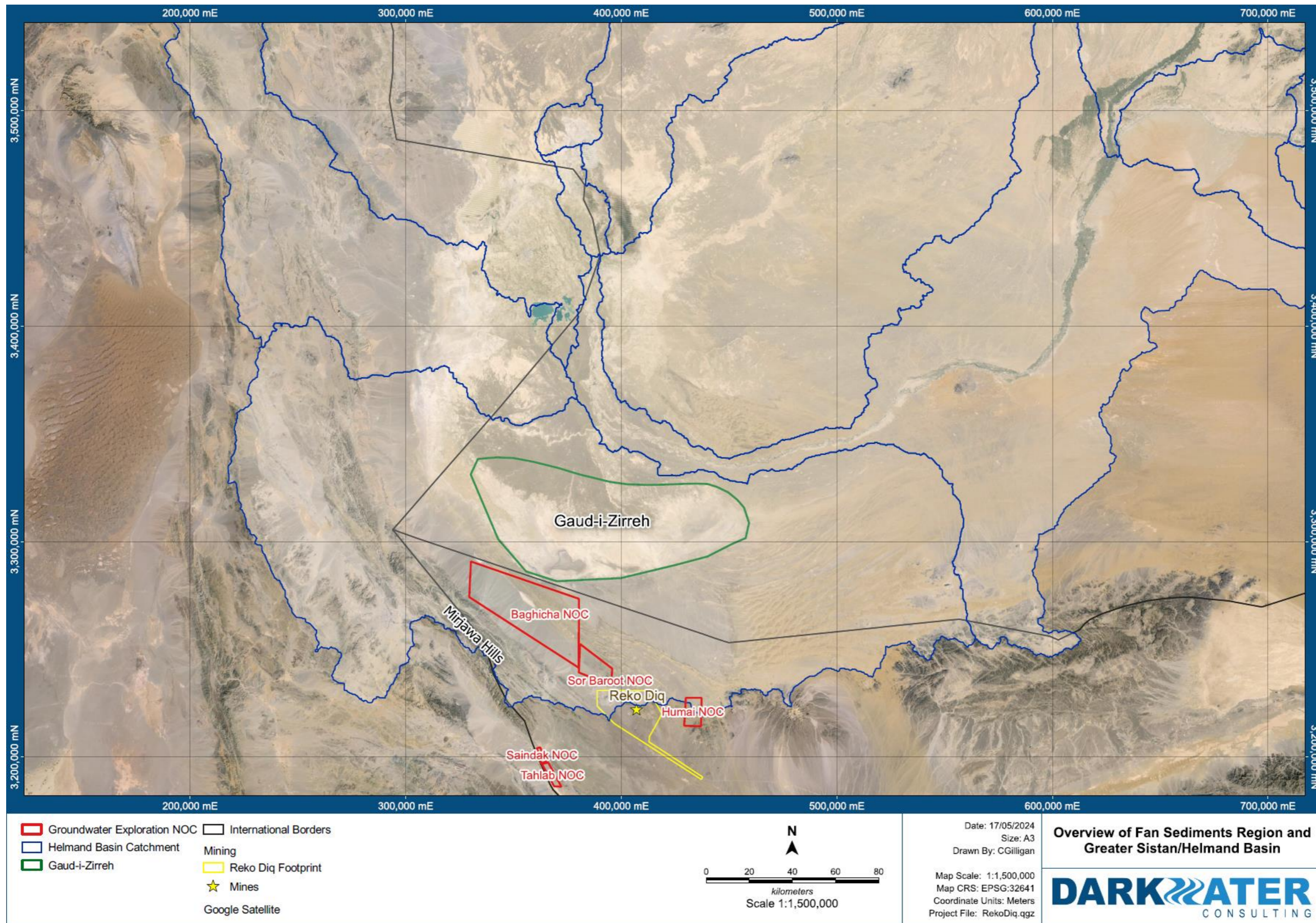


Figure 1: Overview of the Fan Sediments Investigation Area and the Sistan Basin

4. Stage 1 Modelling (2023)

The Stage 1 model was constructed in January 2023, during the period after the recommencement of the Reko Diq project, and prior to further hydrogeological field investigations beginning in August 2023. The objectives of the Stage 1 modelling were to:

- Create conceptual and numerical groundwater models for the Fan Sediments aquifer that represent the most conservative conceptualisation;
- Assess the potential of the Fan Sediments aquifer to meet project water demands using a GMDSI stochastic modelling approach; and
- Use numerical modelling outputs to identify the most influential parameters as input to upcoming hydrogeological field investigations.

4.1 Inputs

Inputs used for the Stage 1 Modelling were limited to data and reporting completed during initial feasibility studies, conducted between 2007 and 2009. Inputs are described in further detail below.

4.1.0 *Reko Diq Hydrogeology Feasibility Study (SMEC, 2009)*

Works completed during the Pre-Feasibility and Feasibility studies are described in detail in the Reko Diq Water Resource Feasibility Study (SMEC, 2009), and are briefly summarised in the Fan Sediments Hydrogeological Factual and Interpretive Report (SMEC, 2024a). Information derived from these reports is provided below.

Hydrogeological drilling completed during this phase is shown in Figure 2. A summary of drilling within the Baghicha (Fan Sediments) NOC during this phase is shown in Table 4-1.

A total of 24 bores were drilled within the Baghicha NOC during the Pre-Feasibility and Feasibility studies. Bores were predominantly drilled along the toe of the colluvial fans, resulting in a mostly linear arrangement. Additionally, the Sor Baroot NOC, immediately south-east of the Baghicha NOC, was investigated as a potential fractured rock aquifer water supply. Basement was intersected at depths ranging from 7 to 20 m bgl.

Drilled depths range from 60 to 394 meters below ground level (m bgl). No drilling was interpreted to have intersected the base of the unconsolidated sediments. As such, there was uncertainty regarding the total thickness of the sedimentary package, and no intercepts or characterisation of underlying material to assist in constraining geophysical interpretation of basin geometry.

The sedimentary package was described as displaying a high degree of horizontal and vertical heterogeneity. Sediments are observed to be of mixed provenance, deposited in a range of depositional environments. Lenses of material ranging from gravels to clays are present. The sedimentary package was interpreted to be sufficiently hydraulically connected, both horizontally and vertically, such that sediments could be assessed as a single aquifer unit.

Groundwater level measurements provided in the 2009 SMEC report are shown in Figure 3. Due to the linear arrangement of bores, the south-east to north-west groundwater flow is primarily observed, while any gradient from the Mirjawa Hills in the south-west towards Gaud-i-Zirreh in the north-east is poorly defined.

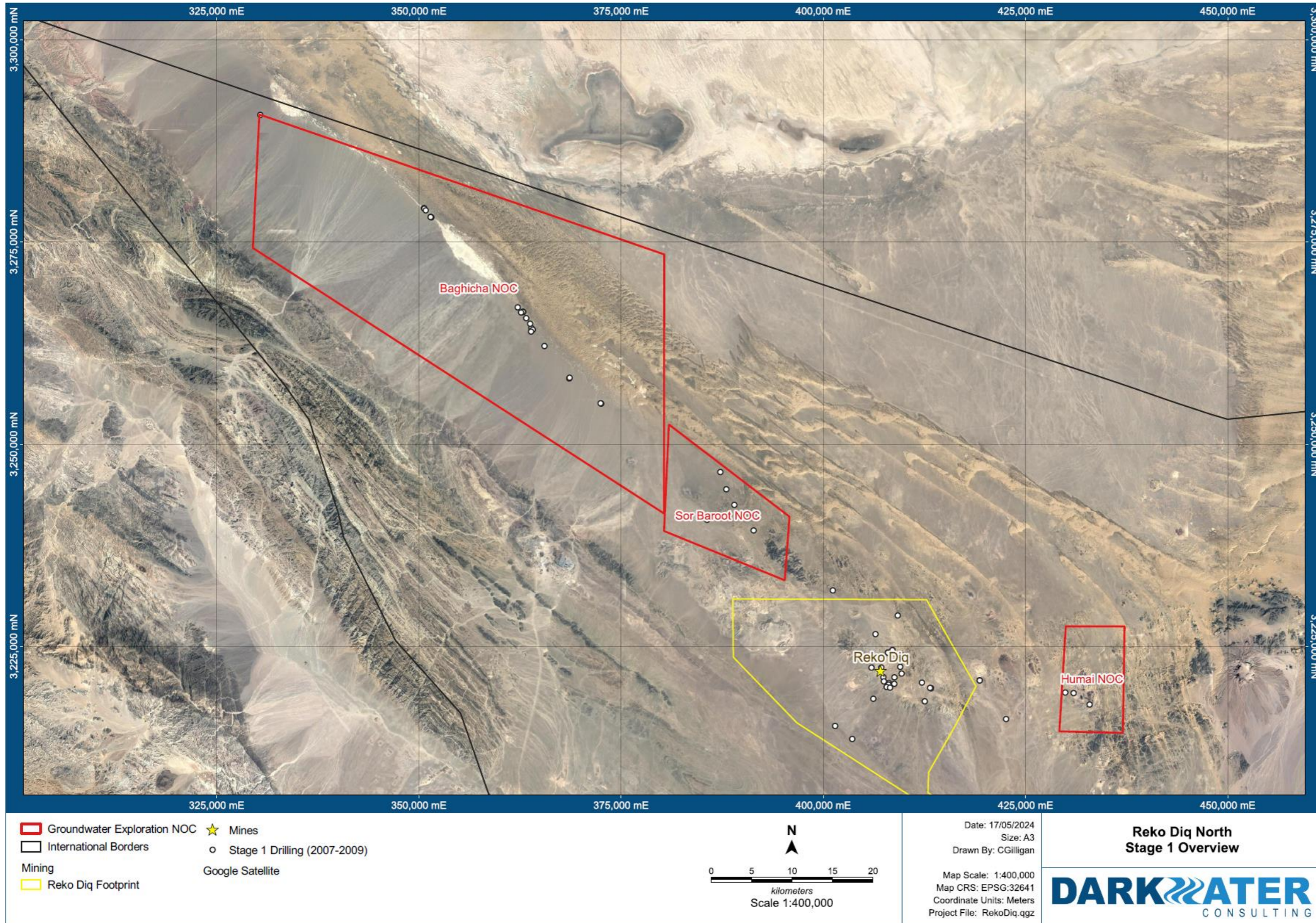


Figure 2: Drilling Completed in the Baghicha NOC and surrounding areas during 2009

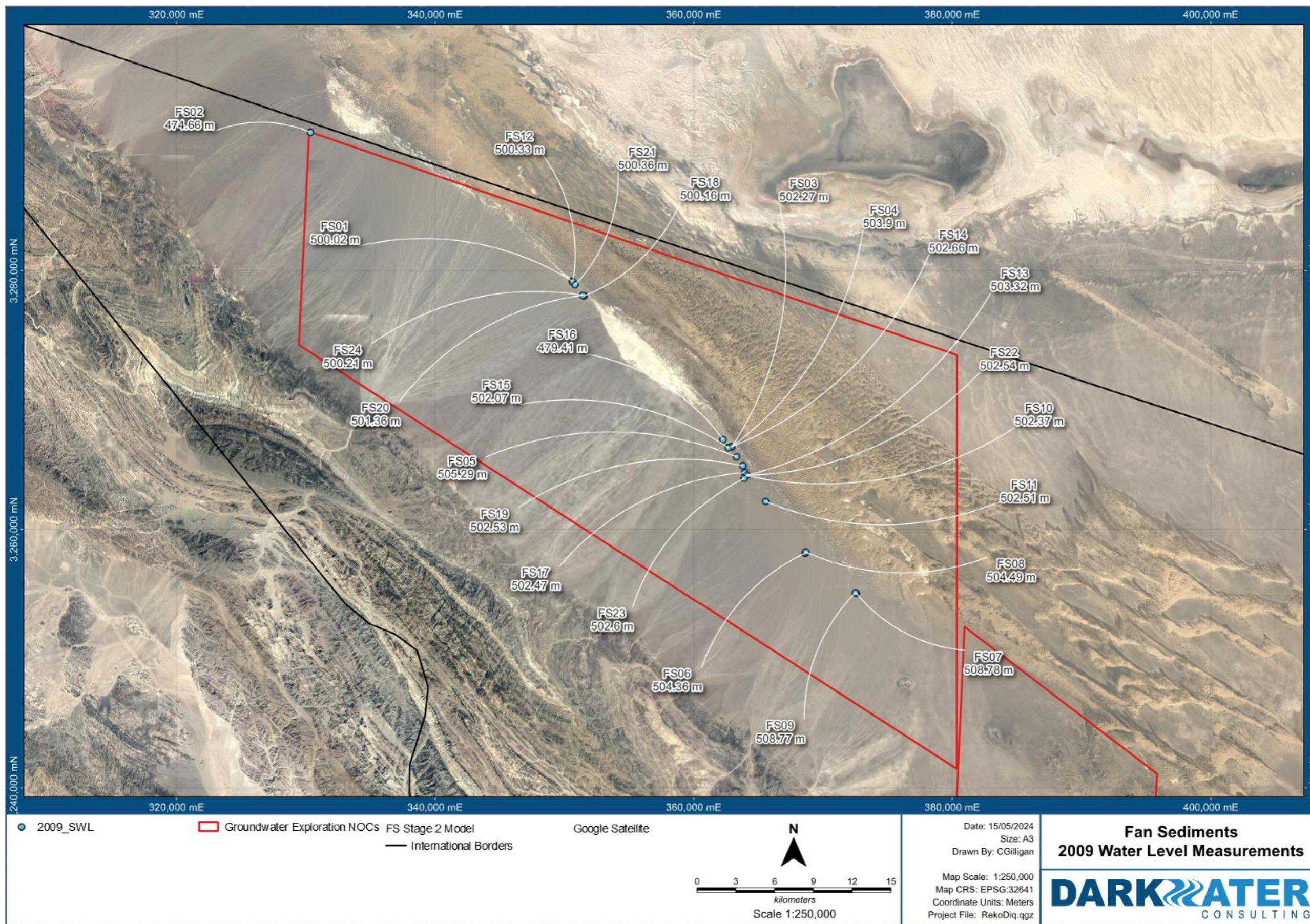


Figure 3: Groundwater Measurements in Feasibility Study Drilling, 2009

Table 4-1: Summary of project hydrogeological test holes in the Fan Sediments NOC, 2007 to 2008 (Derived from SMEC, 2024a)

No.	Type	Easting (m)	Northing (m)	Depth (m)	Screen (m)	SWL (m)	Transmissivity (m ² /day)	Salinity (µS/cm)	Completion Month/year
Pre-Feasibility Study									
FS01	Piezometer	350643	3279184	96	66-90	47.05		11,450	19.09.07
FS02	Piezometer	330401	3290691	275	51-269	52,50		7,150	04.10.07
FS03	Piezometer	362904	3266347	234	102-228*	53.85	385-400	11,886	29.10.07
FS04	Production	362883	3266366	213	126-207*	53.25	320-450	8,740	03.11.07
FS05	Piezometer	363281	3265585	246	108-234*	54.26	420-460	8,750	27.11.07
FS06	Piezometer	368593	3258130	312	180-258*	100.01	50-60		05.03.08
FS07	Piezometer	372552	3255022	274	180-264*	114,92	68	18,200	05.03.08
FS08	Production	368644	3258222	314	69-193*	99.32	50	8,900	21.03.08
FS09	Production	372474	3255066	243	186-198	115,06	68-72	16,100	02.05.08
FS10	Piezometer	364031	3264135	304	180-280*	63.54	370	10,230	26.05.08
FS11	Piezometer	365535	3262139	314	137-254*	74.94		11,260	02.06.08
Feasibility Study									
FS12	Piezometer	350686	3279106	275	64-192*	47.23		5,740	11.08.08
FS13	Production	364074	3264150	250	111-183*	62.71	360	10,620	19.08.08
FS14	Piezometer	362873	3266363	81	60-76	53,18	10	8,760	02.08.08
FS15	Piezometer	362645	3266285	250	136-212*	53.71	440	9,610	07.08.08
FS16	Piezometer	362232	3266918	70	64-68	50.14	856	8,360	10.08.08
FS17	Piezometer	363915	3264361	232	84-184*	61.98	600	10,300	14.08.08
FS18	Piezometer	351556	3278034	250	88-140*	47.16	450	10,850	15.08.08
FS19	Piezometer	363769	3264895	80	72-76	59.14		11,540	17.08.08
FS20	Production	351471	3278086	268	102-252*	46.32	375	7,740	02.09.08
FS21	Piezometer	350862	3278899	75	62-70	47.13		5,700	19.08.08
FS22	Piezometer	364081	3264160	85	70-78	63.07		10,500	26.08.08
FS23	Piezometer	363881	3263920	394	350-389	66.00	1,480	10,750	30.08.08
FS24	Piezometer	351460	3278075	60	50-58	47.18		5,790	30.08.08

* Multiple screens; ** Radiocarbon dating FS04=24,130+-120, FS18=10.680+-80 years

4.2 Assumptions

Given the significant uncertainties remaining after completion of the Pre-Feasibility and Feasibility studies, a number of assumptions were required during translation to a hydrogeological conceptual model.

A conservative philosophy was employed during this process. Where uncertainties existed, the approach was to adopt the most conservative characterisation, such that numerical modelling predictions would represent the 'worst-case' water supply scenario. In doing so, the prospectivity of the groundwater system is not artificially inflated. Additionally, numerical groundwater modelling predictions could be used to prioritise future fieldworks which reduce uncertainty.

As the base of the unconsolidated sediments was undefined, the total depth of drilling was used to constrain the aquifer thickness in drilled areas. The interpreted aquifer thickness derived from geophysical surveys exceeded the depth of drilling and was not constrained by any observed basement intercepts. Geophysical interpretations of aquifer thickness were therefore not used in order to maintain the conservative approach.

The conceptual model developed in the 2009 SMEC report described the aquifer as continuous, extending laterally towards the north-east, across the Pakistan-Afghanistan border, where groundwater would flow in a north-eastern direction and discharge into Gaud-i-Zirreh. At the time of the Stage 1 model construction, there was no direct evidence to support extension of the aquifer towards Gaud-i-Zirreh, nor did water level monitoring support a north-eastward groundwater flow direction.

The colluvial sediments were assumed to be vertically hydraulically connected, representing a single aquifer unit. This was supported by available testing, including consistent groundwater levels measured in bores with different construction depths across the NOC, and aligned with the primary use of this model being a numerical modelling exercise, which prioritises the simplest representation of the aquifer.

The presence of basement outcrops in the dunes north-east of the drilled area were inferred to represent a potential basement high cutting off any extension of the aquifer towards Gaud-i-Zirreh. The Tozgi Fault, defined by the Mirjawa Hills escarpment, and a nominal line running parallel to the Mirjawa Hills within the dune area were used as basement highs constraining the extent of the aquifer.

In combination with the base of drilling, the geometry of the aquifer was defined as a north-west/southeast trending 'channel' aquifer, where groundwater inflows occur along the south-eastern margin and flow north-west towards the Iranian border.

4.3 Conceptual Model

A schematic showing the Stage 1 conceptual model is provided in Figure 4.

As described in Section 4.2, The Fan Sediments aquifer was conceptualized as an unconfined, north-west/south-east trending channel, bound by the Mirjawa Hills along the south-western margin, and by a basement high inferred to underlie the sand dunes along the north-eastern margin.

The conceptual model consists of two (effectively one) hydrostratigraphic unit/s:

- Undifferentiated sediments; and
- Basement (bedrock).

Undifferentiated sediments refer to the primarily unconsolidated colluvial and alluvial material deposited along the base of the Mirjawa Hills, which constitutes the primary aquifer in the area. Basement refers to any consolidated material underlying the tested depth of the undifferentiated sediments. The basement unit is effectively hydraulically 'inactive' for numerical groundwater modelling purposes.

Historical groundwater measurements provided in the 2009 SMEC report were used to define a groundwater system which flows from south-east to north-west. Inflows to the aquifer were inferred to occur along the south-eastern margin of the model, where basement rocks outcrop or occur at shallow depths, and outflows were inferred to occur along the north-western margin of the model, into the assumed extension of the Fan Sediments aquifer across the Iranian and Afghanistan borders.

4.4 LeapFrog Translation

A two-layer geological model representing the conceptual model described in Section 4.3 was constructed using LeapFrog Geo.

Spatial data used in constructing the LeapFrog model is shown in Figure 5.

The constructed model directly corresponds to the Stage 1 conceptual model. The upper layer refers to all unconsolidated material deposited along the Mirjawa Hills, constituting the primary aquifer. The base of the aquifer is constrained using a combination of inputs:

- Base of drilling within the Baghicha NOC – in absence of basement intersects, the base of drilling was assumed to represent the maximum depth of the primary aquifer;
- Sor Baroot NOC drilling – Basement intersects were identified in investigative drilling completed in the Sor Baroot NOC. These intersects were used to constrain the primary aquifer thickness towards the south-eastern margin;
- Satellite imagery – basement outcrops on satellite imagery were used to constrain the lateral extent of the primary aquifer. These were primarily the outcropping formations of the Mirjawa Hills, exposed bedrock within the Sor Baroot NOC, and exposed bedrock within the sand dunes, north-east of investigative drilling in the Baghicha NOC; and
- Inferred basement outcrop along the north-eastern margin – an inferred basement high was included, representing the lateral extent of the primary aquifer along the north-eastern margin. A line was defined from the exposed bedrock within the sand dunes, towards the north-west, running parallel to the outcropping Mirjawa Hills.

Lateral extent and saturated thickness of the unconsolidated sediments layer is shown in Figure 6.

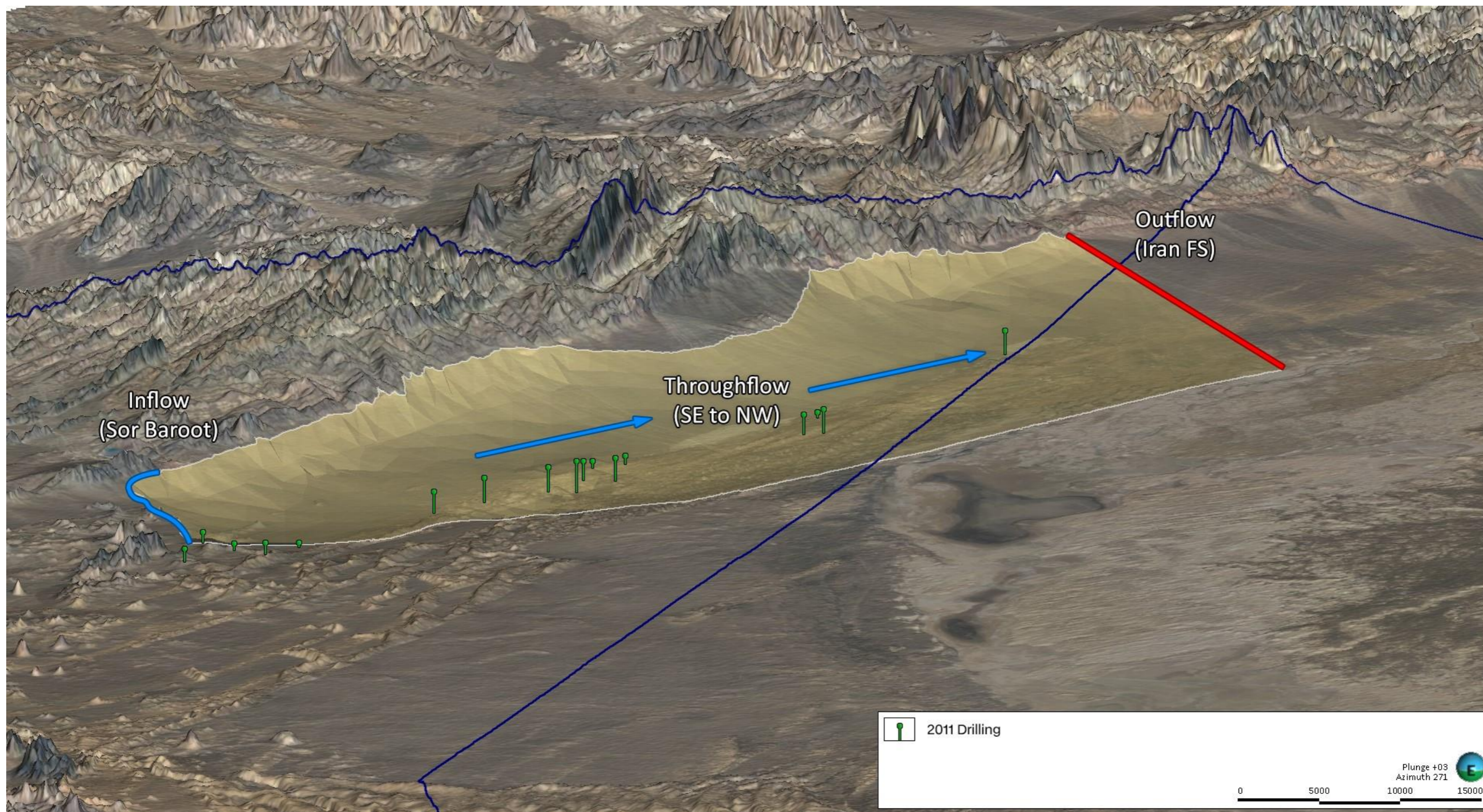


Figure 4: Stage 1 Conceptual Model Schematic

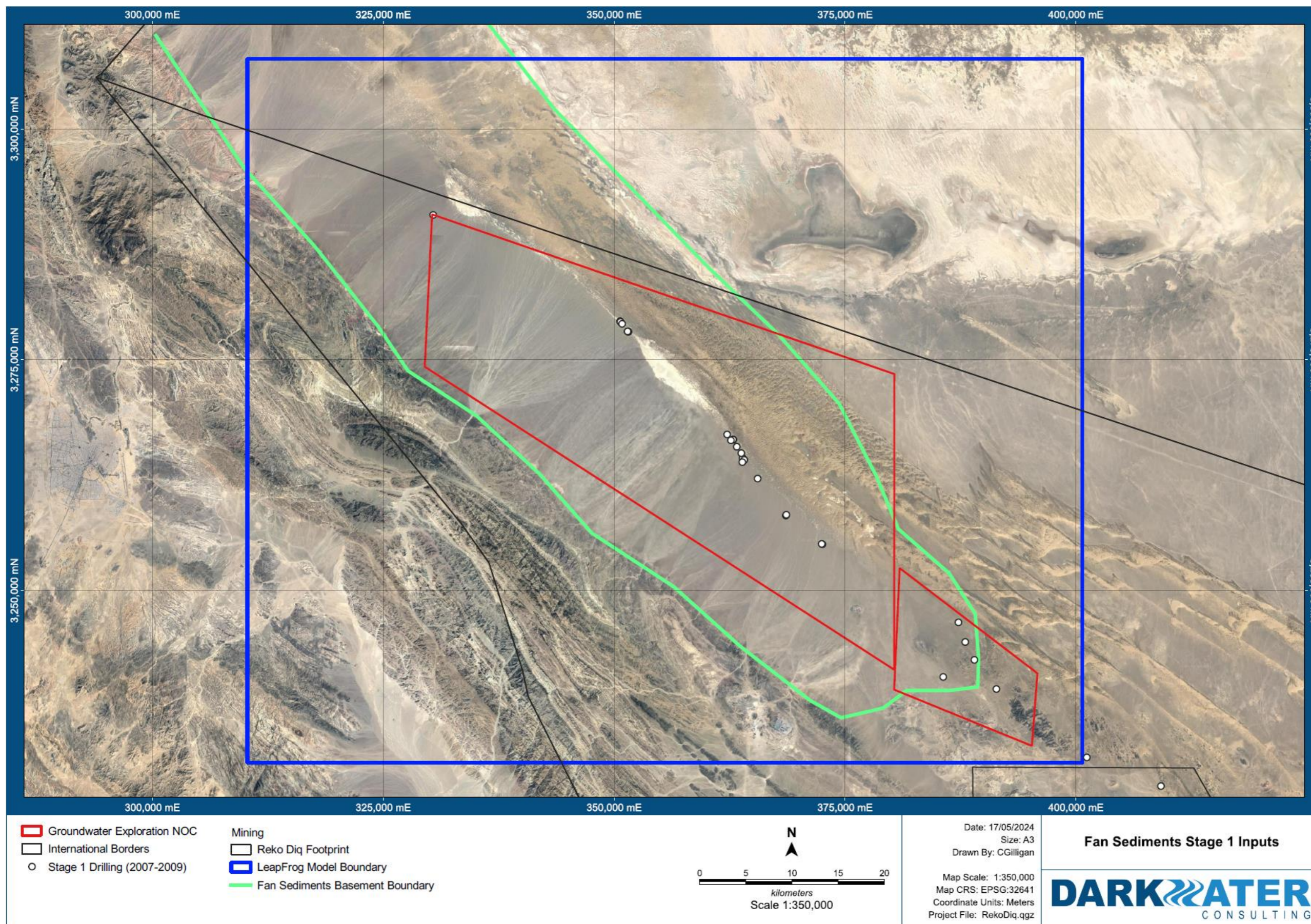


Figure 5: Inputs used when constructing the Stage 1 Geological Model

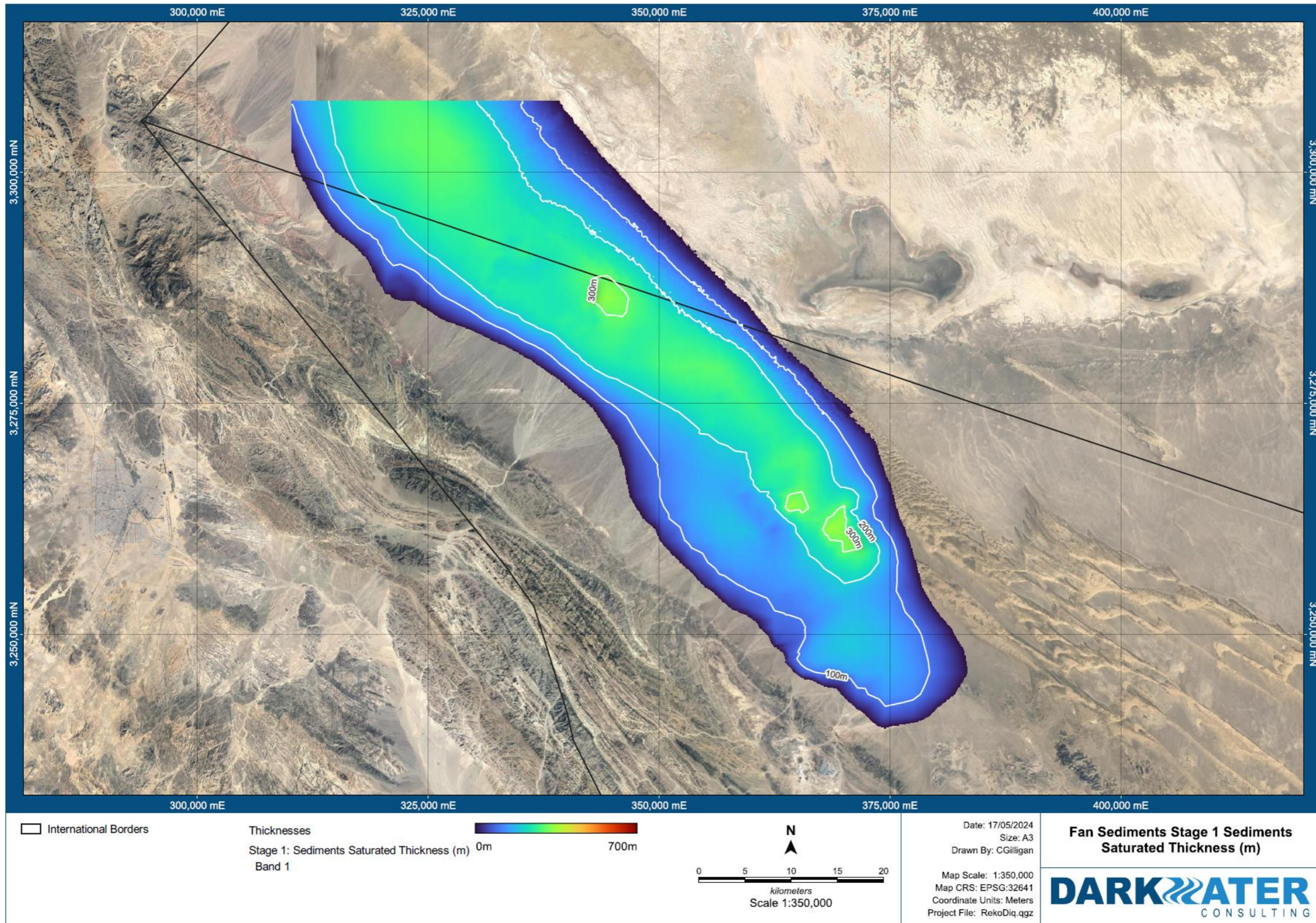


Figure 6: Saturated Thickness of Undifferentiated Sediments, Stage 1 Model

5. Stage 2 Modelling (2024)

The Stage 2 model was constructed in January 2024, as the most recent phase of field hydrogeological investigations approached completion. The updated geological model used inputs from various investigations undertaken since April 2023, and an updated conceptual model agreed upon during a hydrogeology workshop conducted on February 1st, 2024.

5.1 Inputs

5.1.0 2023 Hydrocensus (HBP, 2023)

Hagler Bailly Pakistan (HBP) completed a hydrogeological census across the Project footprint, inclusive of the area surrounding the Baghicha NOC. This survey was performed to identify environmental and social receptors as inputs to environmental impact assessments. The status of bores constructed during initial feasibility studies were verified, and third-party hydrogeological information was compiled.

The census identified eight community water supply points in the Fan Sediments region, all being located along or behind the escarpment of the Mirjawa Hills. Observed water levels in these community water supply points are hundreds of metres higher than water levels within the Fan Sediments aquifer, indicating limited hydraulic connectivity between expressions of groundwater in the Mirjawa Hills and the Fan Sediments aquifer.

Of the most relevance to the updated Fan Sediments conceptualisation, the census identified a water supply bore used by the Frontier Corps (FC) at Imtiaz Fort. The location of the Imtiaz Bore is shown in Figure 7.

The Imtiaz Bore is located north of the sand dunes, along the Afghanistan border. This area was interpreted as beyond the extent of the Fan Sediments aquifer during the Stage 1 model construction.

Lithological logging obtained for the Imtiaz Bore describes a sequence of interbedded sand and clay layers, indicating a potential extension of the Fan Sediments aquifer, and a facies transition towards a lower energy depositional environment.

The Imtiaz Bore is artesian and uncapped, flowing at approximately 3 litres per second (l/s). The bore was subsequently capped and equipped with a pressure gauge. The potentiometric surface was measured as being 6.5 metres above ground level (m agl), approximately 10 m lower than water level measurements taken in FS bores 14 km away.

Information derived from the Imtiaz Bore indicated that the Fan Sediments aquifer extended towards the Afghanistan border, that there is a hydraulic gradient towards the border, and that a confining layer sufficient to maintain artesian pressures was present.

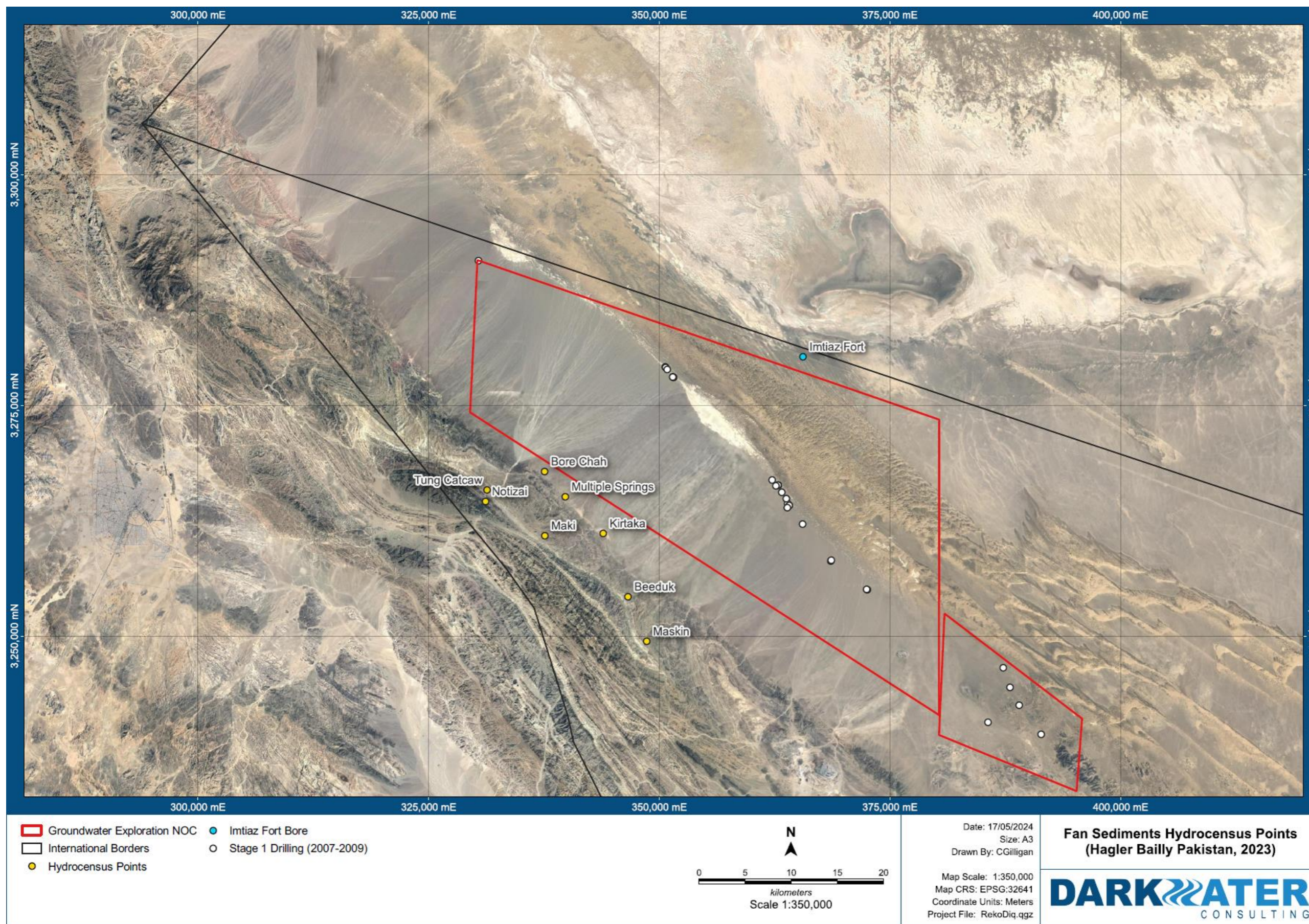


Figure 7: Hydrocensus Points (HBP, 2023)

5.1.1 2024 Hydrogeological Report (SMEC, 2024a)

The most recent phase of drilling in the Fan Sediments area commenced on the 30th August, 2023. A total of 16 bores were drilled within the Baghicha NOC. The goals of this program were to:

- Establish bores further up the piedmont slope, towards the Mirjawa Hills, and north of the dunes, towards the Afghanistan border, to constrain groundwater flow directions and characterise the continuity of the aquifer properties;
- Drill at increased depths to characterise any changes in aquifer properties at depth; and
- Intersect the contact between the aquifer and underlying basement to constrain basin geometry and aid in calibration of geophysical data.

Hydrogeological drilling completed during this phase is shown in Figure 8. A summary of drilling completed is shown in Table 5-1: Summary of project hydrogeological test holes in the Fan Sediments NOC, 2023 to 2024 (Derived from SMEC, 2024a).

Groundwater contouring produced by SMEC is shown in Figure 9. Establishment of a gridded monitoring network during this investigative phase allowed for a more accurate definition of groundwater flow directions. Groundwater flow within the Fan Sediments aquifer consists of two components:

- Inflows from Sor Baroot along the south-eastern margin of the system; and
- Inflows from the Mirjawa Hills along the south-western margin of the system.

These two components result in a northerly to north-easterly hydraulic gradient within the borefield area and support the lateral continuation of the Fan Sediments aquifer towards Gaud-i-Zirreh.

Drilling across the profile of the Fan Sediments aquifer characterised changes in lithology and associated depositional environments. Distinct groupings of depositional environments as described in the 2024 Hydrogeological report (SMEC, 2024a) are:

- From the piedmont slope extending up to 20 km from the Mirjawa Hills and to a depth of about 500 m about halfway down the slope (FS028 and FS029) – Coarse Sandy gravel to gravelly sands with cobbles, fine to coarse sand generally low in fines and poorly sorted. Cobbles and gravel are angular, sub rounded, and matrix supported. This material constitutes mountain outwash colluvial fan deposits with irregular sand, silt, and silty clay layers.
- Lacustrine and fluvial deposits underlying the piedmont slope deposits along the Afghan border to a depth of +700 m and being at least 400 m thick – Fine to coarse sand, silty sands, silty clays, and clays with some gravels, poorly to moderately sorted, sub angular to sub rounded. The occurrence of gravels decrease to the northeast as the occurrence of clays increases, especially in the top 160 m. Clays are brown to yellow brown, sticky and interbedded with sand layers representing deposition in a lake (lacustrine) environment.
- Recent aeolian deposits which may be up to 40 m thick formed from wind erosion within the Sistan Basin overlying the transition from piedmont slope colluvial deposits to sand dominated lacustrine deposits.

Basement intercepts were recorded in two holes (FS30 and FS31) during drilling. These intercepts were used in subsequent geophysical interpretation to constrain depth to basement across the investigation area.

Core material collected during the drilling of the four diamond drillholes was used in the assessment of hydraulic permeability, grain size distribution, and porosity. This was used to assess the relative change in hydraulic parameters with depth in lieu of field testing at depth. Results of testing indicate that permeability of the aquifer reduces significantly with depth. Permeability results were up to 2 orders of magnitude lower at depths of 700 m when compared to results at a depth of 300 m, indicative of increasing lithification with depth.

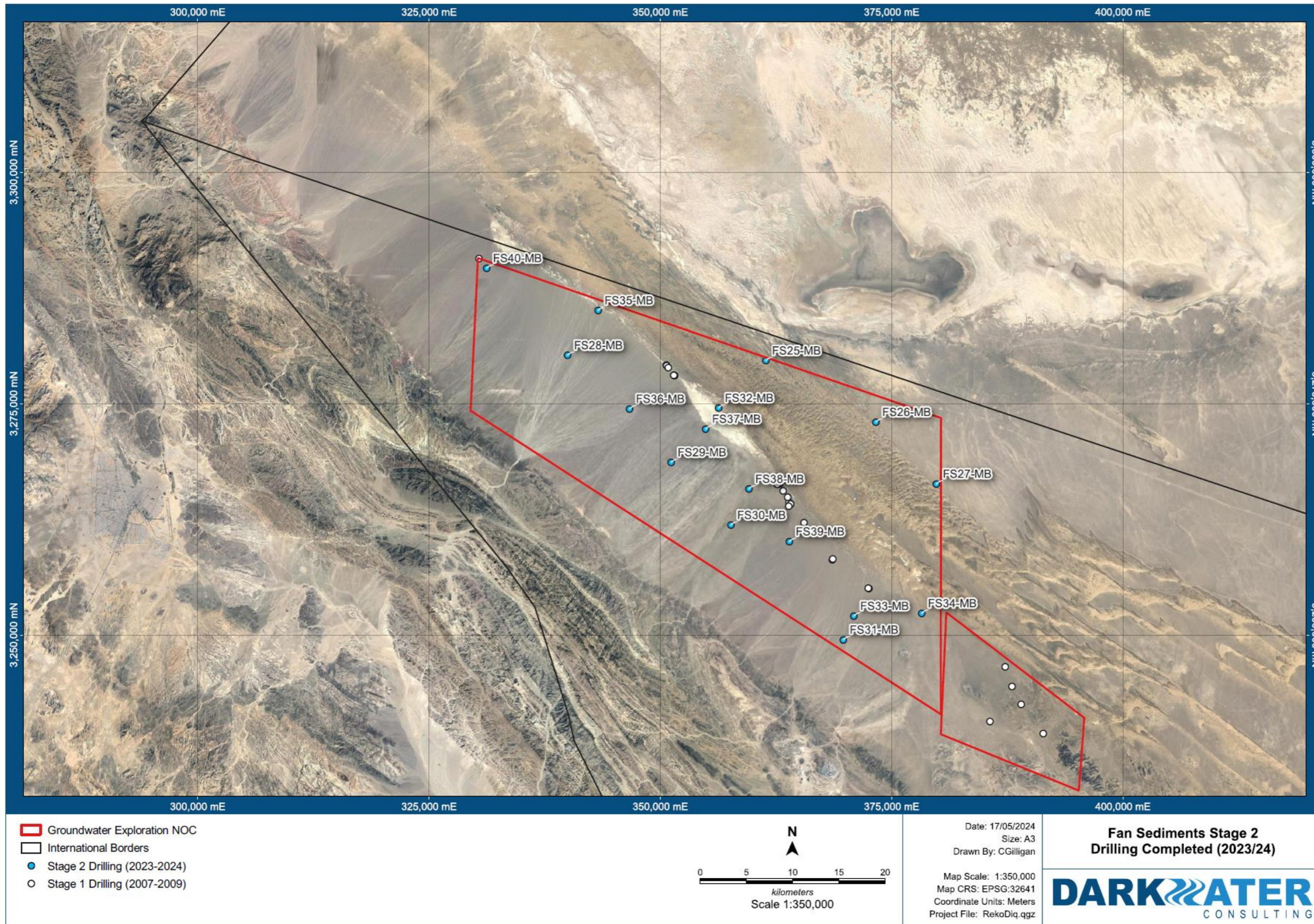
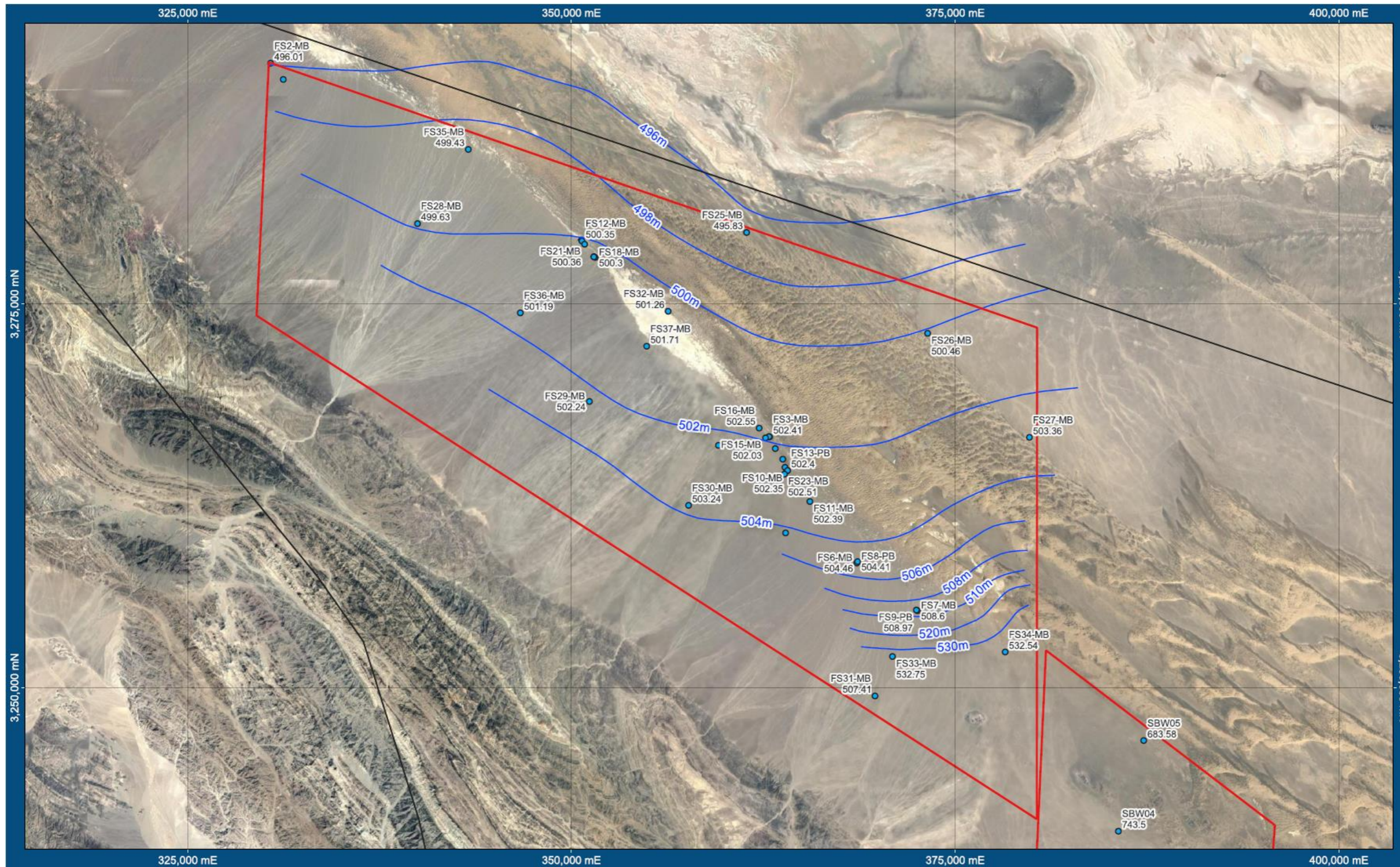


Figure 8: Fan Sediments Drilling Completed in 2023/24 (SMEC, 2024a)



<ul style="list-style-type: none"> ▭ Groundwater Exploration NOC International Borders — Interpreted Groundwater Contours (mASL) ● Water Level Measurements 	<p>N</p> <p>Scale 1:225,000</p>	<p>Date: 17/05/2024 Size: A3 Drawn By: CGilligan</p> <p>Map Scale: 1:225,000 Map CRS: EPSG:32641 Coordinate Units: Meters Project File: RekoDiq.qgz</p>	<p>Fan Sediments Intepreted Head Contours (January 2024) Derived from SMEC, 2024a</p> <p>DARKWATER CONSULTING</p>
--	---------------------------------	---	---

Figure 9: Interpreted groundwater head contours - January 2024 Monitoring (Derived from SMEC, 2024a)

Table 5-1: Summary of project hydrogeological test holes in the Fan Sediments NOC, 2023 to 2024 (Derived from SMEC, 2024a)

Bore ID	Drilling method	Surface casing			Borehole drilling		
		Hole diameter / Depth	Casing diameter / Type	Grout	Hole Diameter	Depth	Total depth drilled
Units		mm / mbgl	mm / Type	mbgl / mbgl	- mm	mbgl / mbgl	- mbgl
FS025-MB	Mud Rotary	305 / 29.5	304 / Steel	0.0 - 29.5	254 / 203	29.5 - 312 / 312 - 400	400
FS026-MB	Mud Rotary	305 / 30	304 / Steel	0.0 - 30	254 / 203	30 - 304 / 304 - 400	400
FS027-MB	Mud Rotary	305 / 30	304 / Steel	0.0 - 30	254 / 203	30 - 122 / 122 - 250	250
FS028-MB	Diamond Core	NA	NA	NA	85	721.3	721.3
FS029-MB	Diamond Core	NA	NA	NA	85	709.1	709.1
FS030-MB	Diamond Core	NA	NA	NA	85	625.8	625.8
FS031-MB	Diamond Core	NA	NA	NA	85	300.3	300.3
FS032-MB	Mud Rotary	254 / 10.5	250 / Steel	0.0 - 10.5	250 / 200	10.5 - 326 / 326 - 400	400
FS033-MB	Mud Rotary	450 / 11	254 / Steel	0.0 - 11	254	11 - 256	256
FS034-MB	Mud Rotary	450 / 10.5	254 / Steel	0.0 - 10.5	254	10.5 - 400	400
FS035-MB	Mud Rotary	305 / 24.9	304 / Steel	0.0 - 24.9	254 / 203	24.9 - 316 / 316 - 400	400
FS036-MB	Mud Rotary	305 / 16.6	254 / Steel	0.0 - 16.6	254 / 203	16.6 - 310 / 310 - 400	400
FS037-MB	Mud Rotary	No surface casing indicated			254	120	120
FS038-MB	Mud Rotary	305 / 21.5	304 / Steel	0.0 - 21.5	254	21.5 - 400	400
FS039-MB	Mud Rotary	305 / 21.5	304 / Steel	0.00 - 21.5	254	21.5 - 380	380
FS040-MB	Mud Rotary	305 / 30	304 / Steel	0.0 - 30	254	30 - 120	120

5.1.2 2024 Geophysical Report (SMEC, 2024b)

Geophysical investigations and derived interpretations are provided in the Fan Sediments Geophysical Factual and Interpretive Report (SMEC, 2024b). A summary of the findings, as relevant to the hydrogeological conceptualisation and subsequent geological model construction, are provided below.

The initial phase of geophysical investigations involved review of historical surveys and open file datasets utilising a range of geophysical methods, completed between 1977 and 2010. These include ground gravity surveys conducted by Coffey in 2008, publicly available Gravity Recovery and Climate Experiment (GRACE) satellite Gravity Data and airborne magnetics, Induced Polarization (IP) and Transient Electromagnetic (TEM) undertaken by BHP between 1999 and 2004 and ground magnetics undertaken by TCC from 2004 to 2010.

Ground-based gravity surveys were deemed to be the most effective tool for constraining the basin geometry. Additional lines of gravity surveys were collected to establish coverage across the investigation area. Lithological information obtained from field sampling, and lithological and geophysical logging of drilling were used to calibrate geophysical models.

Limited accessibility within the dunes and an inability to perform surveys in Afghanistan required the utilization of remote sensing methods. GRACE satellite data was processed to generate a 5 x 5 km resolution gridded dataset. This dataset was calibrated using ground-based gravity surveys to extrapolate the basement surface where field data is limited.

A 'Base of Primary Aquifer' surface was generated to be used as inputs to the construction of the geological model in LeapFrog Geo. Data used to generate this surface included:

- Rock Outcrop points (extracted - GIS) where surface outcrop was present and observable;
- Drilling (borehole basement strikes) This included those boreholes which clearly intersected basement material only (e.g. FS-030, FS-031, FS-007 and FS-009 were included as they were inferred to have intersected basement, Kirtaka Bore, Sor Baroot bores SB4 and SB5, and WW15-MB and WW18-MB for some control to the south);
- Geophysics Grids, TEM, GRACE Gravity Data (levelled to ground data), and Regional Magnetics; and
- Structural analysis and interpretations (extrapolated points for grid control).

A Categorized map of geophysical point inputs and a derived basement surface map are shown in Figure 10 and Figure 11 respectively.

5.1.3 2024 Remote Sensing Assessment (Darkwater, 2024)

Outputs from Fan Sediments investigations indicated that the conceptual model would require expansion to include Gaud-i-Zirreh. A remote sensing assessment was completed in 2024 by Darkwater Consulting Pty Ltd. The objectives of this assessment were to quantify surface water extent across Gaud-i-Zirreh and the greater Sistan Basin over time, define the role of Gaud-i-Zirreh within the hydrogeological conceptual model and the mechanisms by which it may be inundated.

Publicly available satellite imagery (Landsat 5, 7 and 8) was used to provide a continuous dataset from 1984 to present day at a spatial resolution of 30 metres. Satellite imagery was processed using the Modified Normalized Difference Water Index (MNDWI), a widely employed spectral analysis method used to delineate surface water bodies.

Results of the assessment are shown in Figure 12. The presence of surface water in Gaud-i-Zirreh and the greater Sistan Basin peaked in 1993 and has steadily decreased until 2004. There has been no persistent surface water within Gaud-i-Zirreh from 2004 to the present. Surface water extents within the greater Sistan Basin are also significantly reduced and are limited to seasonal inundation, rather than permanent presence of water observed prior to 2004.

These reductions are also reflected in observed volumes stored in Kajaki Dam, indicating that this reduction could be due to a reduction in Helmand River inflows rather than a strategic decision to reduce flow downstream from Kajaki Dam. References are made to a significant drought between 1998 and 2001 (Mayar, 2023). This is most likely the primary cause of reduced surface water inflows to Kajaki Dam, reduced outflows from Kajaki Dam downstream and, ultimately, reduced recharge to Gaud-i-Zirreh and other hamouns.

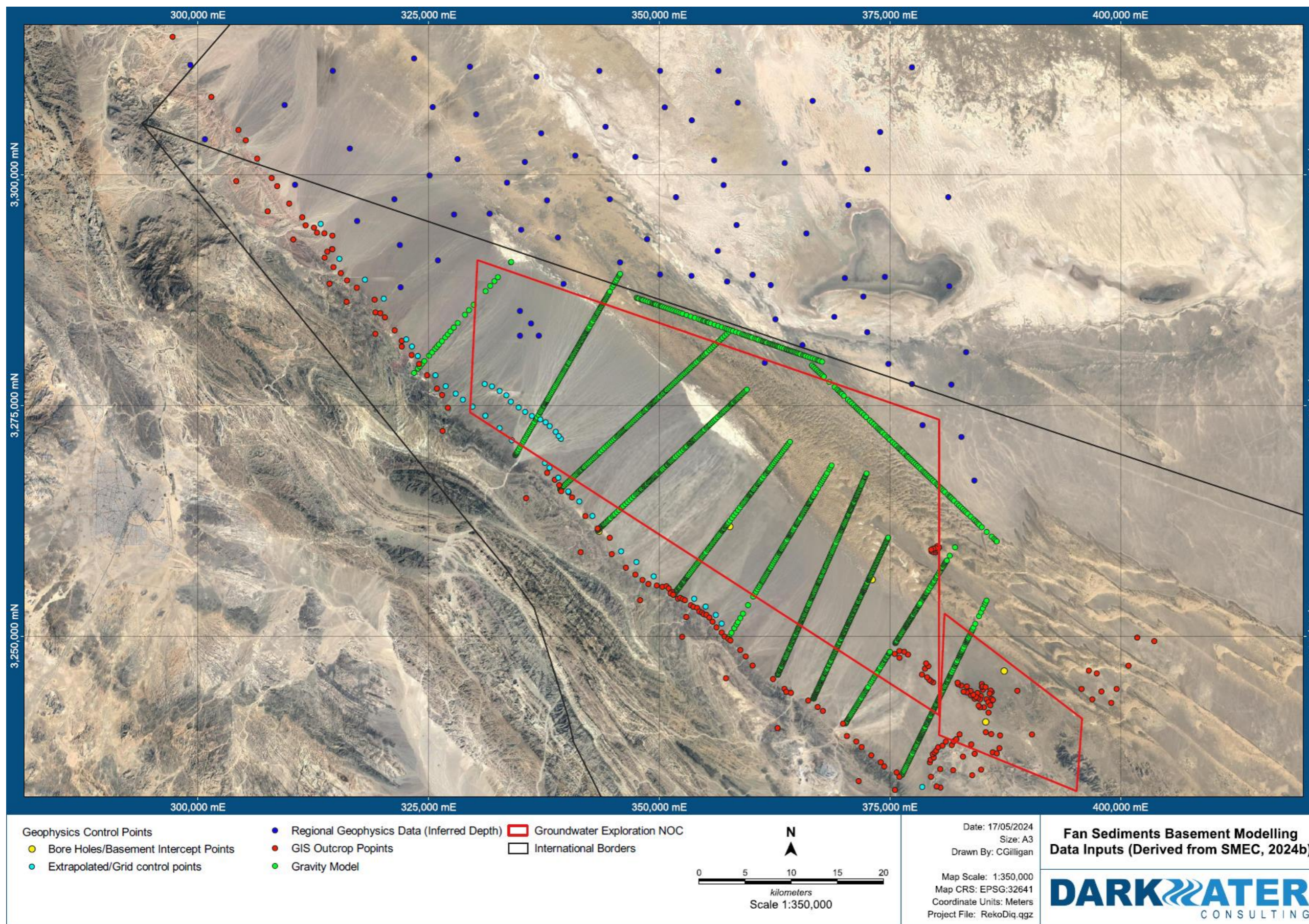


Figure 10: Summary map of the distribution of the data points and their sources which were applied for the gridding of the model surface (Derived from SMEC, 2024b)

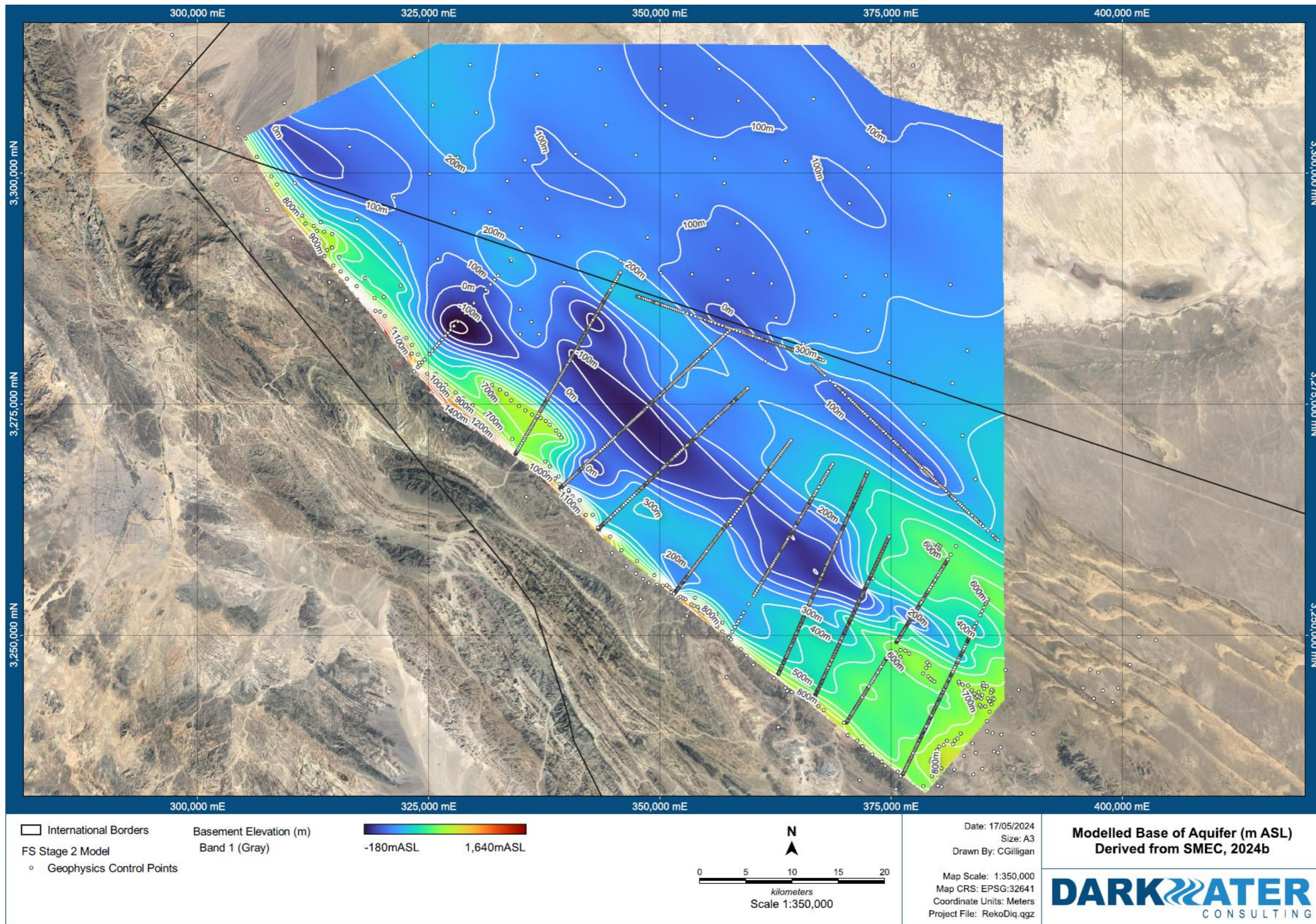


Figure 11: Modelled base of aquifer meters above mean sea level (Derived from SMEC, 2024b)

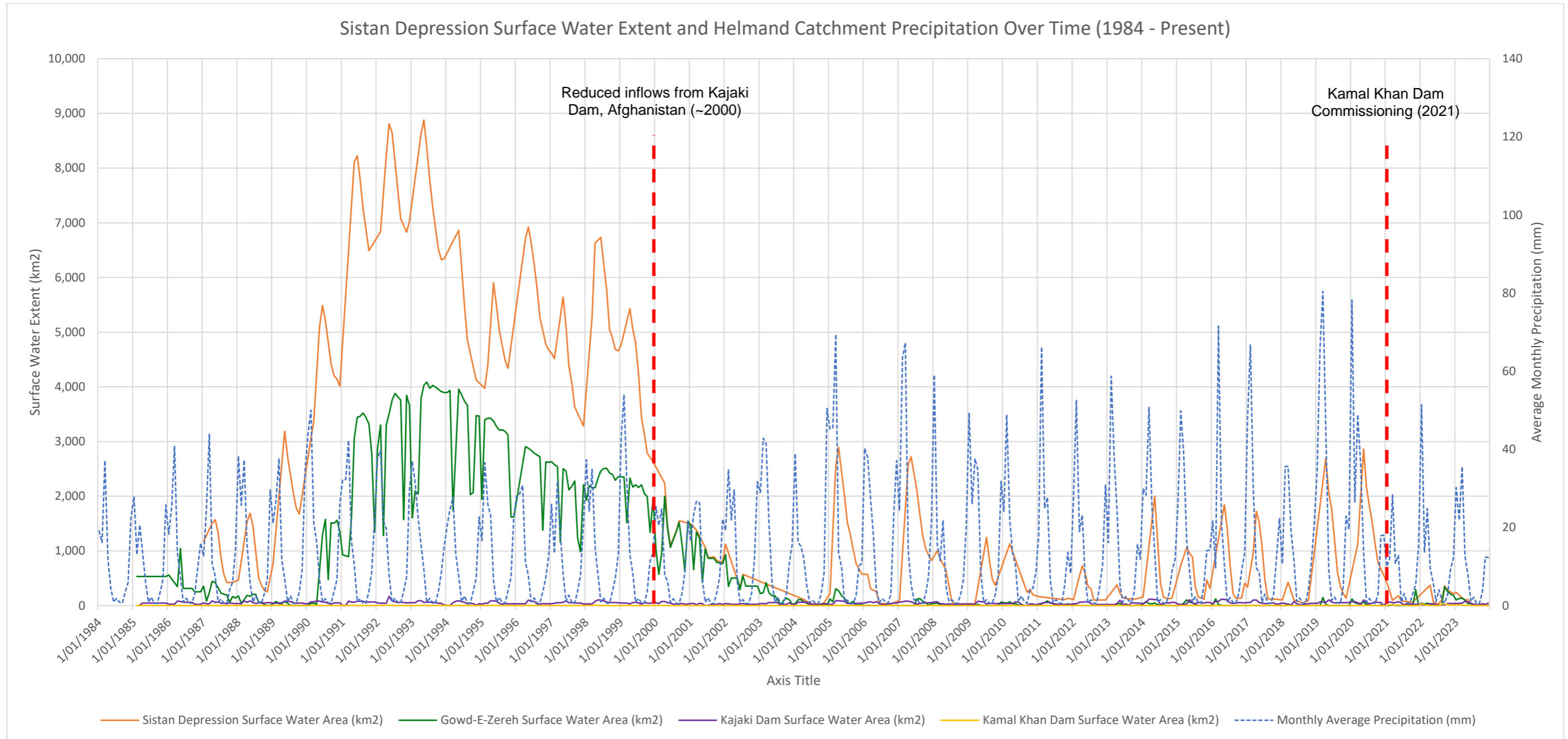


Figure 12: Helmand River Dam Surface Water Extent and Helmand Catchment Precipitation Over Time (1984 - Present) (Darkwater, 2024)

Other areas of the Sistan Basin continue to respond to seasonal inundation events until the commissioning of Kamal Khan Dam in 2021. The Kamal Khan Dam, located in Afghanistan immediately upstream of the Iranian border, appears to have further reduced Helmand River inflows to Iran. Post-2021, minor inundation events of Gaud-i-Zirreh are attributed to planned releases of water from Kamal Khan Dam along an excavated trench, directly onto Gaud-i-Zirreh.

This assessment supported the characterisation of Gaud-i-Zirreh as a primarily surface water-fed environmental feature. The reduction in surface water extent over time is attributed to a combination of climatic variation in the Helmand River Basin recharge, increasing agricultural and domestic usage of the Helmand River upstream in Afghanistan and Iran, and compounding disruption of surface water flows via construction of dams and reservoirs.

Groundwater is not considered a significant contributor to the Gaud-i-Zirreh water balance and does not sustain any surface expression of water. Gaud-i-Zirreh is therefore not defined as an environmental receptor in relation to drawdown impacts associated with abstraction.

5.2 Assumptions

Works completed during this investigative phase have significantly reduced the number of conceptual uncertainties and associated assumptions required.

Core testing indicates that hydraulic parameters of the aquifer (hydraulic conductivity and specific yield) decrease with depth. This is attributed to a combination of changes in depositional environment, described as a transition from a colluvial to fluvial/lacustrine depositional environment, and diagenetic processes.

There are limited inputs to provide an effective cutoff depth for aquifer prospectivity, or a three-dimensional surface which reflects these reductions in hydraulic parameters at depth. A combination of lithological logging, core photography and downhole geophysical logging were used by SMEC to provide a 'base of effective aquifer' value for model construction.

The deepest boreholes drilled during this phase (FS28 and FS29) were assessed and estimated to display reduced aquifer prospectivity beyond a depth of 506 to 547 m bgl, or 122 to 84 metres above sea level (m asl). This 'base of aquifer' cutoff was only relevant to the deepest portion of the system, located within the north-west trending trough in the piedmont slope area.

The aquifer extent was expanded significantly to accommodate an updated conceptual model which extends beyond the Afghanistan border and encompasses Gaud-i-Zirreh. Due to an inability to collect field data outside of Pakistan, most of the required assumptions relate to definition of hydrostratigraphic units within Afghanistan.

Outputs from the geophysical investigation performed by SMEC (SMEC, 2024b) were used to constrain bedrock elevations across the project area, including within Afghanistan. Interpreted bedrock elevations within Afghanistan are derived from GRACE data calibrated using the closest available field gravity survey data. There are no available geological datasets to verify this extrapolated bedrock geometry.

Artesian pressures at Imtiaz Bore indicate the presence of a laterally extensive confining layer in the topographical low north of the dunes associated with Gaud-i-Zirreh. Based upon lithological logging from Imtiaz Bore and FS25, the confining unit was assumed to be a nominally 40 m thick clay sequence

overlying the aquifer unit. This unit onlaps the aquifer at approximately the toe of the piedmont slope, increasing in thickness towards the north-east underneath the sand dunes.

Finally, the characteristics of aquifer sediments in Imtiaz Bore and FS25, representing a lower-energy depositional environment, are assumed to continue northwards beneath Gaud-i-Zirreh. Given the facies change observed within the groundwater system inside of Pakistan, it is possible that further shifts in depositional environment are present. Indeed, as per known depositional characteristics of internally draining basins, sediments are likely to become increasingly clay-dominant, further reducing hydraulic parameters, and limiting the effective extent of the aquifer.

5.3 Conceptual Model

Schematics showing the Stage 2 conceptual model are provided in Figure 13 and Figure 14.

As described in Section 5.2, the Fan Sediments aquifer is conceptualized as an unconfined to confined groundwater system. There is an observed transition from unconfined conditions within the colluvial fan portion of the aquifer, to confined conditions beneath the sand dunes abutting the foot of the colluvial fans, with artesian pressures observed north of the sand dunes along the Afghanistan border.

Recharge to the system is limited, and is thought to occur via a combination of:

- Mountain-front infiltration of runoff from catchments along the Mirjawa Hills at the south-western margin of the groundwater system;
- Groundwater inflows via bedrock along the Mirjawa Hills at the south-western margin of the groundwater system; and
- Groundwater inflows from the Sor Baroot area, along the south-eastern margin of the groundwater system.

These inflow components produce a north-to-northeast groundwater gradient that generally reflects the topography. Groundwater is understood to report to Gaud-i-Zirreh, located north-east of the borefield area. At Gaud-i-Zirreh, artesian groundwater pressures facilitate upward leakage of groundwater, where shallow groundwater evaporates and is removed from the system. Vertical leakage rates are understood to be insufficient to sustain surface water at Gaud-i-Zirreh, as demonstrated in remote sensing assessments (Darkwater, 2024).

Two depositional environments are interpreted within the investigation area:

- Mountain outwash colluvial fans emanating from the Mirjawa Hills – these deposits extend from the piedmont slope up to 20 km from the Mirjawa Hills and to a depth of about 500 m halfway down the slope (FS028 and FS029) – Coarse sandy gravel to gravelly sands with cobbles, fine to coarse sand generally low in fines and poorly sorted. Cobbles and gravel are angular, sub rounded, and matrix supported.
- Fluvial to lacustrine deposits – these deposits underly the piedmont slope deposits along the Afghan border to a depth of +700 m and are at least 400 m thick – Fine to coarse sand, silty sands, silty clays, and clays with some gravels, poorly to moderately sorted, sub angular to sub rounded. The occurrence of gravels decrease to the northeast as the occurrence of clays increases, especially in the top 160 m. Clays are brown to yellow brown, sticky and interbedded with sand layers representing deposition in a lake (lacustrine) environment.

- Recent aeolian deposits which may be up to 40 m thick formed from wind erosion within the Sistan Basin overlies the transition from piedmont slope colluvial deposits to sand dominated lacustrine deposits.

The described increase in clay sediments towards the north-east is understood to be responsible for the observed confined to artesian conditions, acting as a confining layer on underlying sediments. Any surficial aquifer associated with aeolian deposits is assumed to be sufficiently hydraulically disconnected from the Fan Sediments aquifer due to the underlying clay-rich unit.

Hydraulic parameters are understood to decrease with depth, attributed to a combination of changes in depositional environment, and diagenetic processes.

Zoning of hydraulic conductivity and specific yield values were generated as inputs to the numerical groundwater modelling and are shown in Figure 15 and Figure 16. These values are derived from a combination of test pumping, recovery testing, slug testing, and core testing. These values represent approximately 300 m of the upper aquifer with the zones generally corresponding to the depositional environments defined in the conceptual model.

5.4 LeapFrog Translation

A geological model representing the conceptual model described in Section 5.3 was constructed using LeapFrog Geo. Where possible, simplifications were made to optimize its value as input to the numerical groundwater modelling and to limit the introduction of additional uncertainty.

The geological model consists of four layers:

- Confining Clay;
- Sediments (Aquifer);
- Consolidated Sediments; and
- Basement.

The extent and thickness of the confining clay layer is shown in Figure 17. This layer is comprised of a portion of the aeolian deposits located immediately north-east of the piedmont slope colluvial deposits, and the underlying confining clay unit conceptually required to maintain the observed confined and artesian aquifer conditions. The explicit delineation of aeolian deposits was not required from a numerical modelling perspective as they are conceptualized to be hydraulically disconnected from the Fan Sediments aquifer which is being assessed.

The saturated thickness of the sediments layer, based upon groundwater measurements collected in January 2024, is shown in Figure 18. This layer effectively represents the Fan Sediments aquifer identified as the primary target for groundwater abstraction.

There is no delineation of the conceptual transition from a colluvial to a fluvial/lacustrine depositional environment. As the intended use of this geological model is as input to a GMDSI numerical modelling exercise, model simplification is prioritized to minimize the number of parameters to be estimated and to reduce model run-times. Of primary importance to numerical modelling is the change in ranges of the hydraulic parameters associated with changes in aquifer materials. Hydraulic conductivity and specific yield zones provided by SMEC are incorporated into the numerical modelling and effectively

represent this distinction between depositional environments not explicitly defined in the geological model.

The extent and thickness of the consolidated sediments layer is shown in Figure 19. This layer is constrained by data showing a significant reduction in aquifer parameters at depth, provided by SMEC.

Lithological logging, core photography and downhole geophysical logging were used by SMEC to provide a 'base of effective aquifer' depth within boreholes FS28 and FS29, located within the deepest portion of the aquifer. The nominal cut-off of 122 to 84 m asl was used to define areas which are interpreted as containing sediments but are not expected to contribute significantly to aquifer storage. During numerical modelling, these cells are effectively treated as hydraulically disconnected basement.

The depth to basement is shown in Figure 20. The Basement surface represents the base of sediments (aquifer), except in areas where the sediments layer is underlain by consolidated sediments. This layer is defined using the 'base of primary aquifer' surface produced during the Fan Sediments Geophysical Factual and Interpretive Report (SMEC, 2024b).

Conceptual Model - Fan Sediments

Rainfall on Mirjawa Hill produces runoff (intermittent and highly variable)

Water table very flat, gradient <0.001, low recharge high permeability. Groundwater system likely in steady state condition with n nearby anthropogenic extraction.

Ground surface drops below water table as near surface clays increase producing confined conditions and artesian pressures at the Afghan border

Sediments consist of colluvial fans adjacent the Mirjawa Hills which may be upto 500 m thick. The colluvial sediments grade to lacustrine / fluvial sediments in the vicinity of Bagitcha. Sediments become finer towards Gowd e Zereh.

Groundwater flow is topography driven being northeast from the Mirjawa Hills towards Gowd e Zereh and northwest from Sor Baroot.

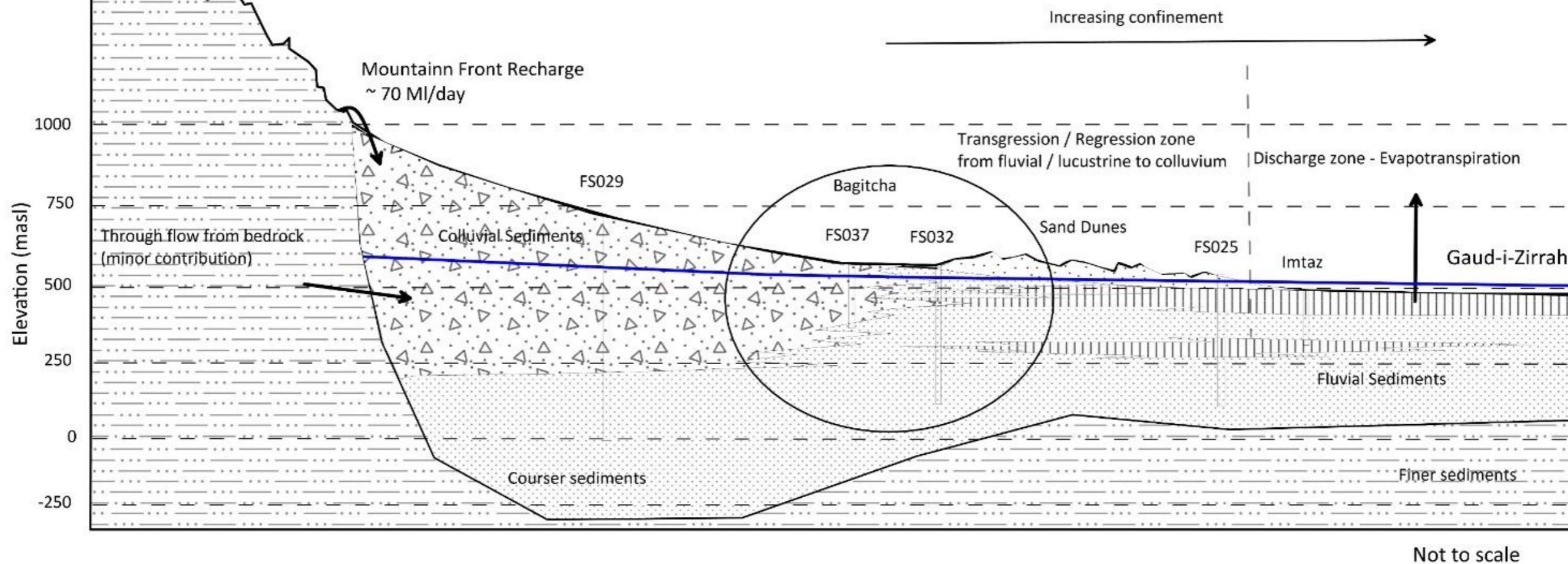


Figure 13: Updated Fan Sediments Conceptual Cross-section (SMEC, 2024a)

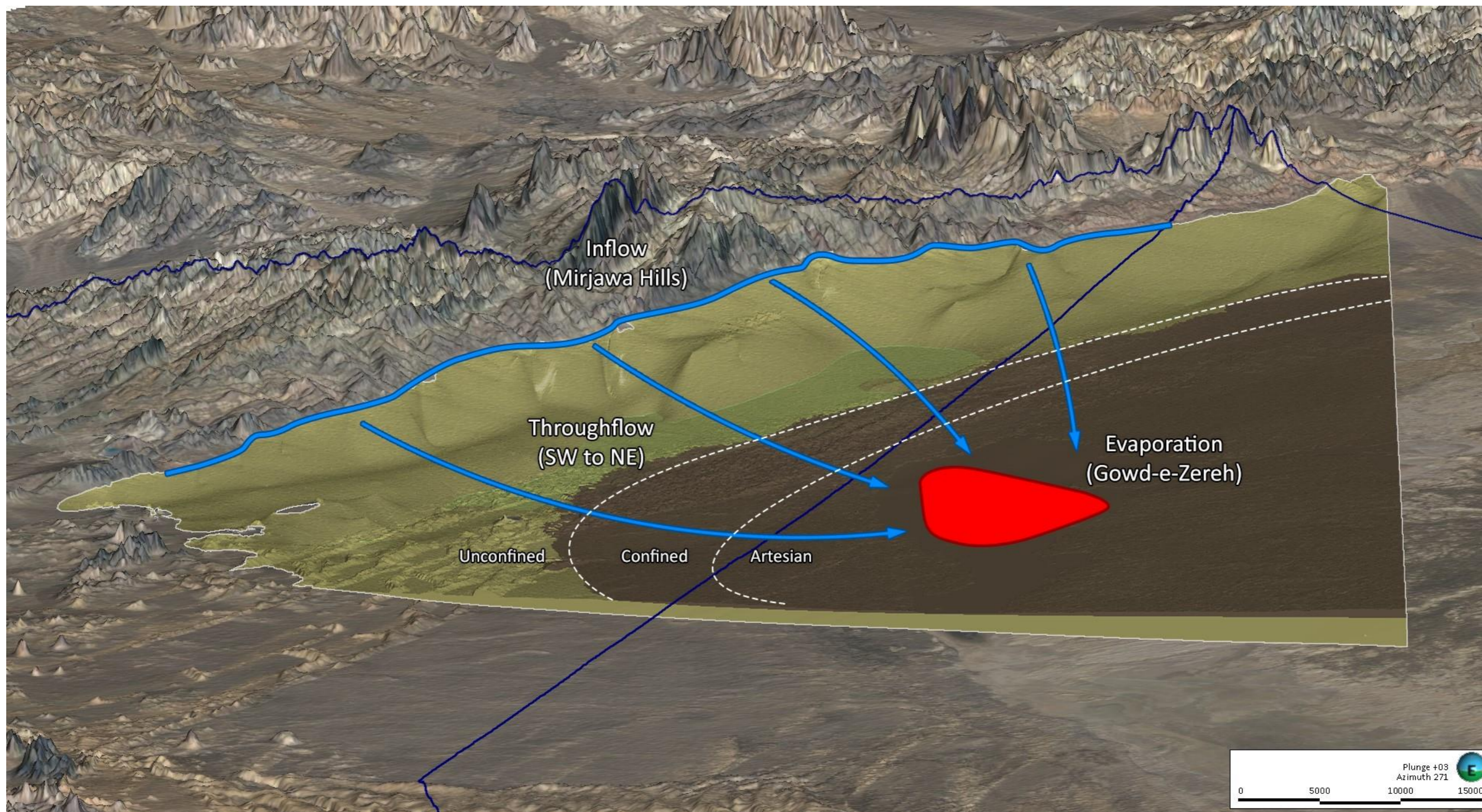


Figure 14: Fan Sediments Isometric Conceptual Model Diagram



Figure 15: Hydraulic Conductivity Zoning (Derived from SMEC, 2024a)



Figure 16: Specific Yield Zoning (Derived from SMEC, 2024a)

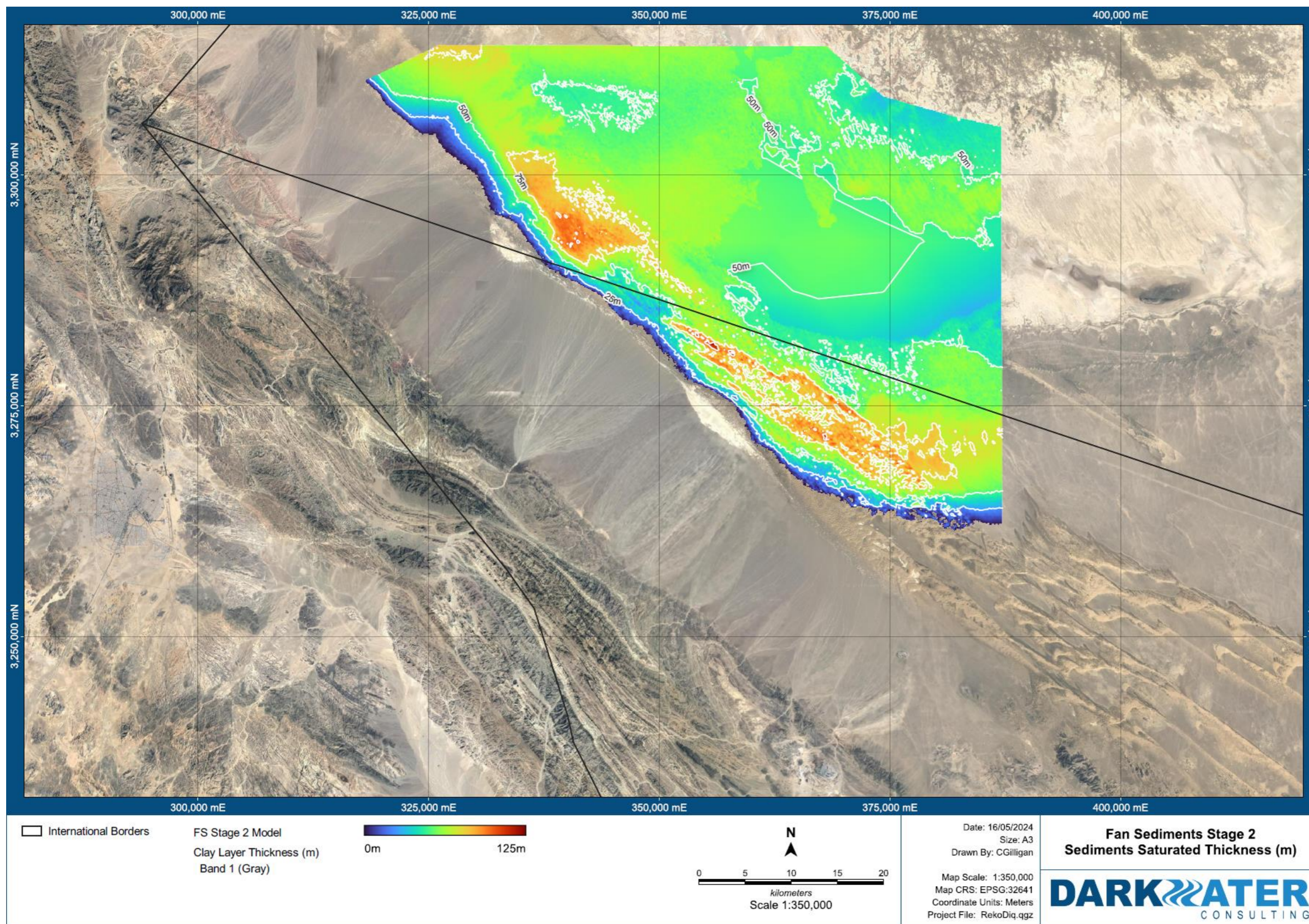


Figure 17: Fan Sediments Stage 2 Model - Confining Clay Layer Thickness

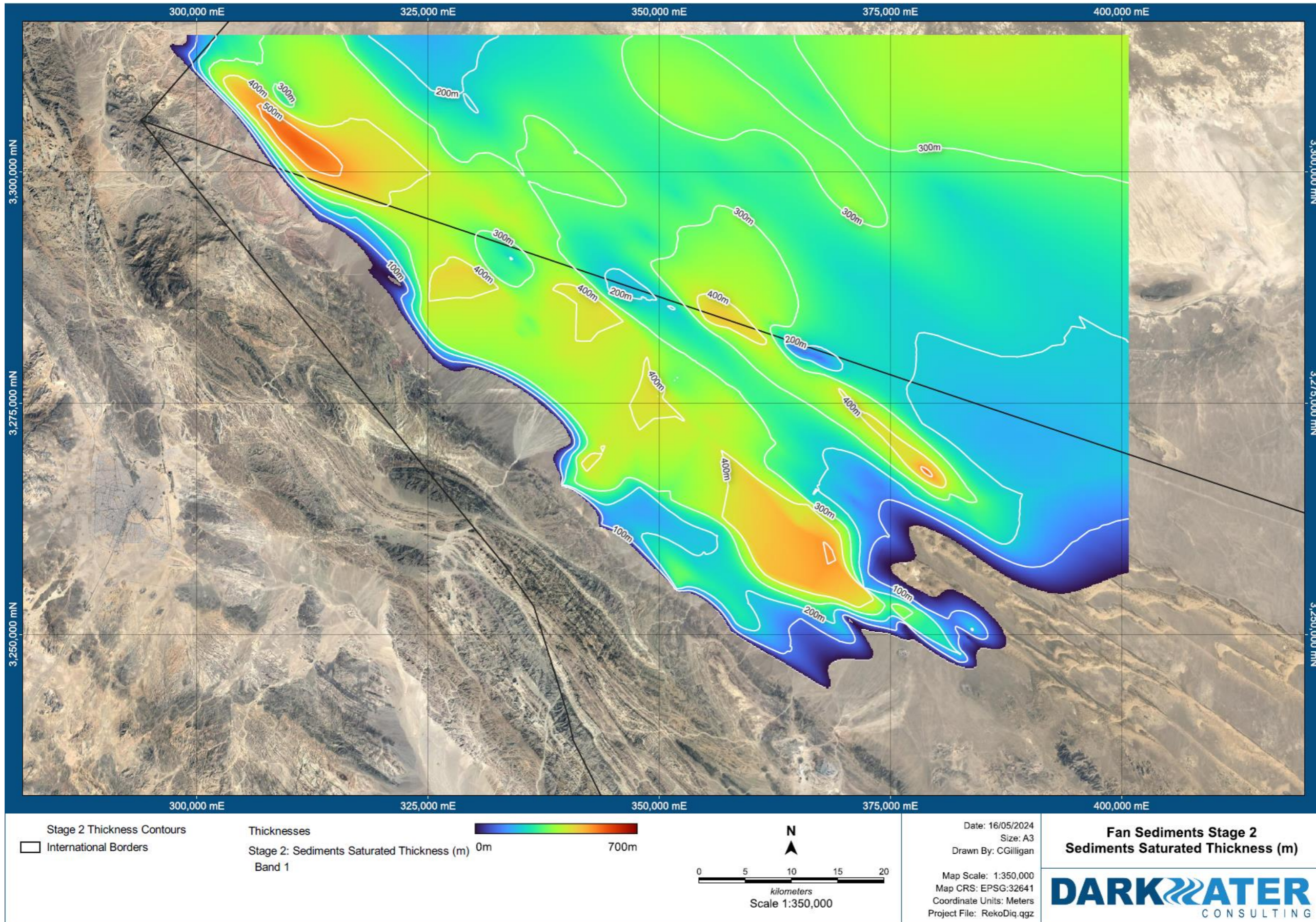


Figure 18: Fan Sediments Stage 2 Model - Sediments Saturated Thickness

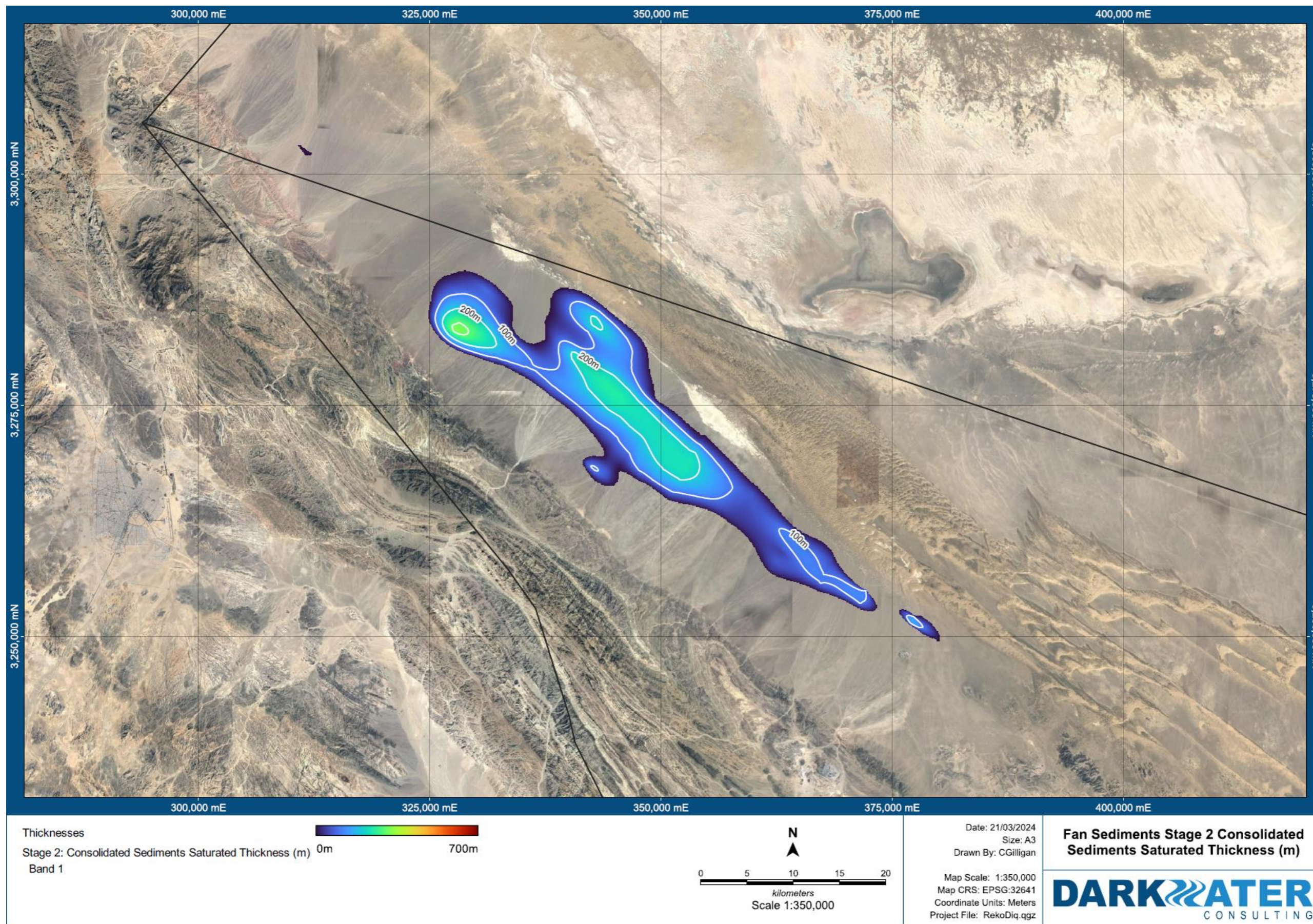


Figure 19: Fan Sediments Stage 2 Model - Consolidated Sediments Thickness

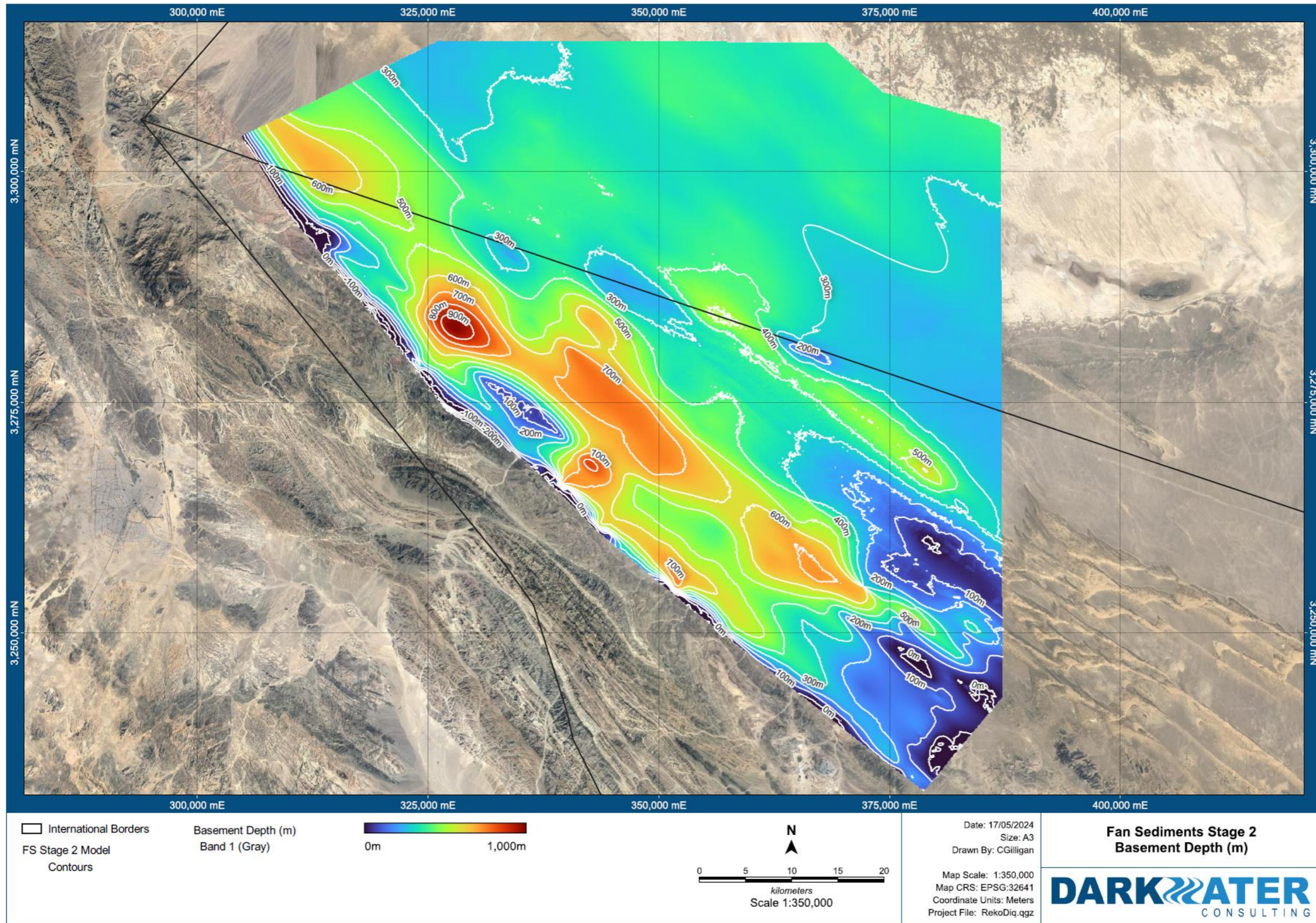


Figure 20: Fan Sediments Stage 2 Model – Depth to Basement

6. Stage 2 Numerical Modelling (2024)

The described conceptual and geological models were used as inputs to a numerical modelling exercise completed by Groundwater Consulting Pty Ltd (GWC). The construction and outputs of this modelling are described in the Fan Sediments Water Supply Modelling – Stage 2 Report (GWC, 2024), attached as Appendix A. A summary of this report is provided below.

Numerical modelling performed by GWC adopted a stochastic approach endorsed by the Groundwater Modelling Decision Support Initiative (GMDSI). Historically, numerical groundwater models have adopted a deterministic approach i.e., observed hydraulic head distributions are explained by a single, unique set of hydraulic parameters. In actuality, there are potentially thousands of unique distributions of hydraulic parameters capable of reproducing the same observation data.

The GMDSI approach assesses a large number of these parameter distributions to generate probabilistic numerical modelling outputs. These outputs describe a statistical distribution of values (e.g., groundwater drawdown, abstraction volumes) across hundreds of unique, calibrated modelling runs. The statistical analysis of these values can be used to identify areas of uncertainty, aligning with the conservative, risk-based approach maintained during conceptualisation and geological model construction.

The objective of this modelling exercise was to assess the ability of the Fan Sediments groundwater system to meet the project water demand, and to evaluate the potential range of drawdown over time resulting from this abstraction. The scenario provided by RDMC (*45MTPA_Raw_Water_Demand_McNulty 240207*) equates to an average water demand of 45.4 GL/a across a 38-year period, peaking at 50.4 GL/a for a duration of 30 years.

A total of 142 models sufficiently calibrated to steady-state water levels and were assessed. Modelling results indicate that across all 142 model runs, the Fan Sediments groundwater system was able to sustain the project water demands. Hydraulic head distributions from these runs were used to produce probabilistic drawdown outputs for impact assessment purposes.

Examples of GMDSI modelling outputs are shown in Figure 21 and Figure 22. The full suite of model outputs are provided in Appendix A.

Hydrograph outputs show changes in drawdown over time across all model runs at a single point in the model e.g., Imtiaz Bore. Wider distributions of hydrographs indicate higher degrees of uncertainty.

Spatial distribution of drawdowns for a specific time-step and probability are provided in the form of drawdown contour maps, where P50 indicates the 50th percentile (mean) drawdown value at each cell across the 142 model runs. P20 (optimistic) and P80 (conservative) drawdown contours are also provided, representing the 20th percentile and 80th percentile of drawdown values at each model cell, respectively.

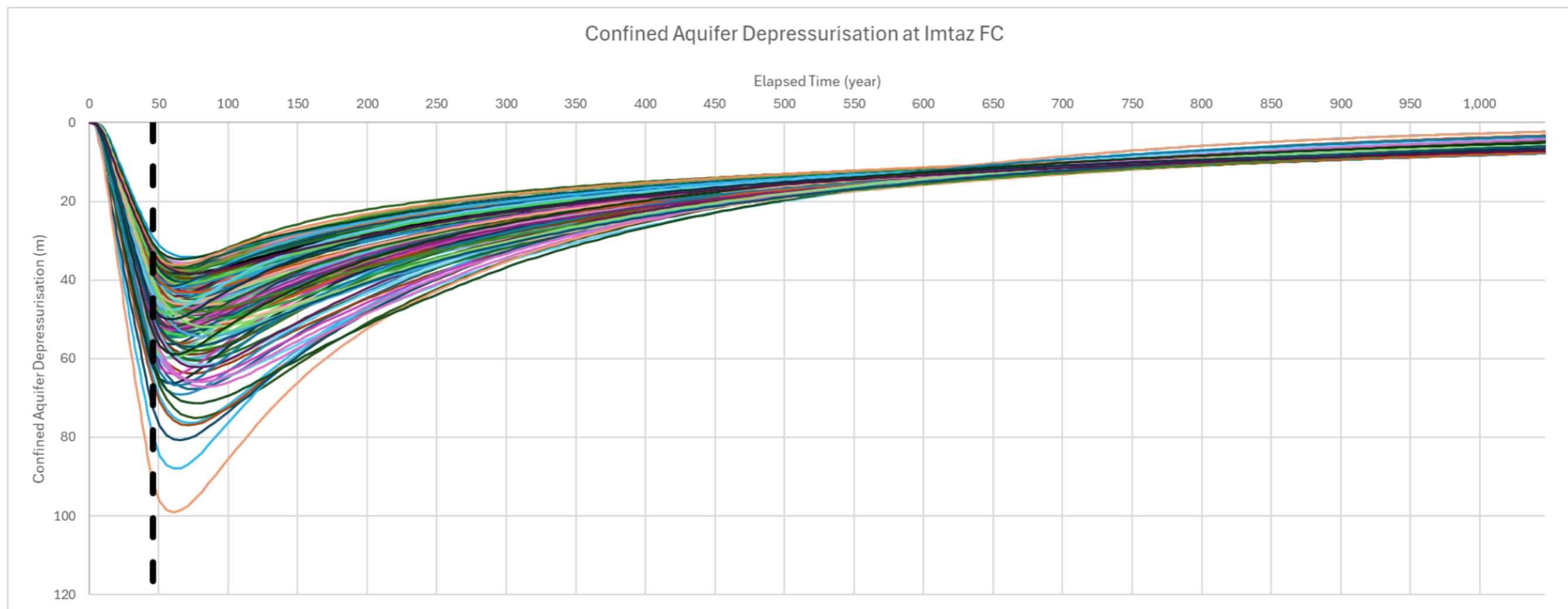


Figure 21: Confined Aquifer Depressurisation and Recovery at Imtiaz Bore (GWC, 2024)

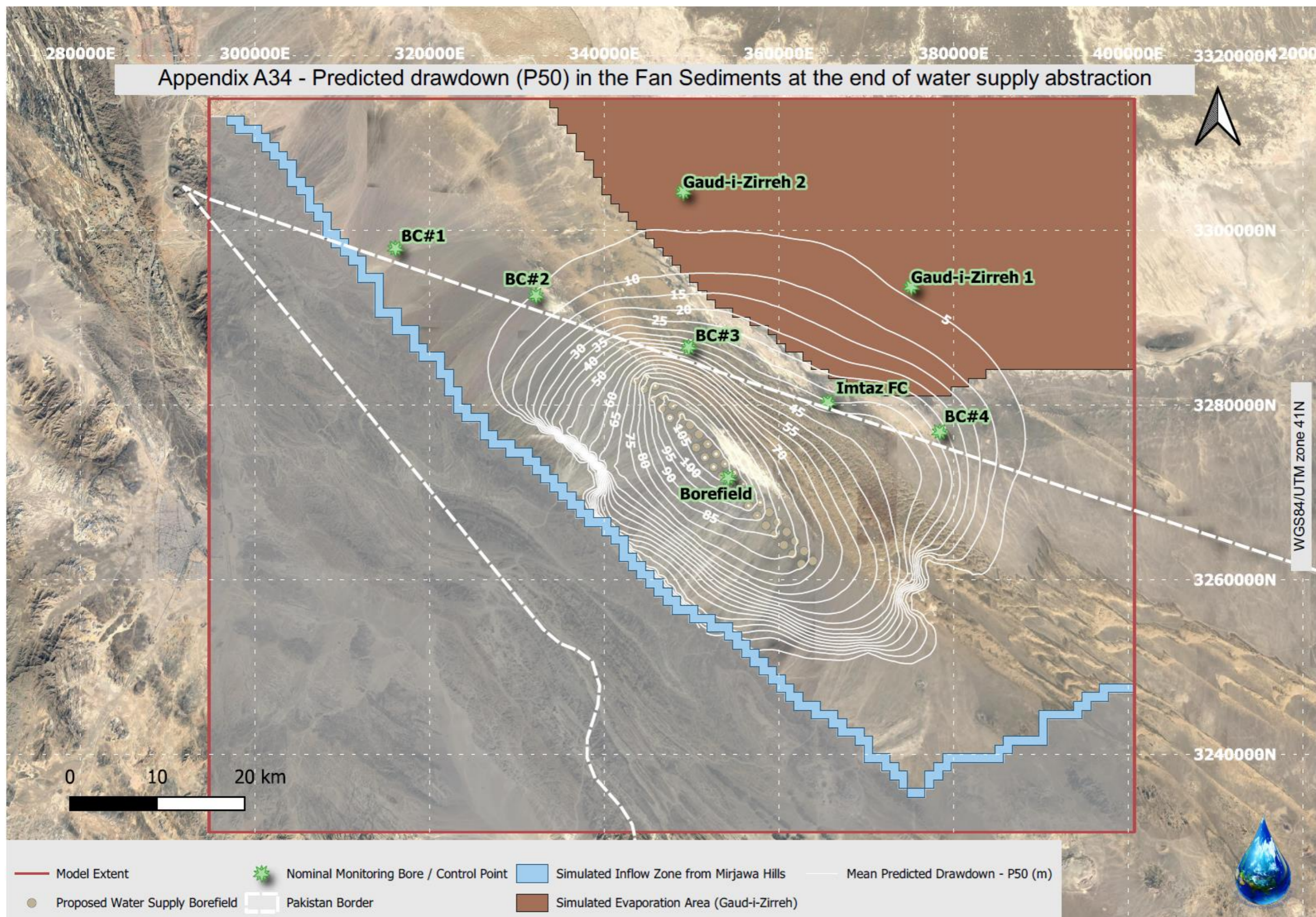


Figure 22: Predicted P50 Drawdown in the Fan Sediments Aquifer at the End of Water Supply Abstraction (GWC, 2024)

7. Discussion

A cross-sectional comparison between the Stage 1 and Stage 2 geological models is shown in Figure 23.

The additional works completed as inputs to the Stage 2 geological modelling and subsequent numerical groundwater modelling have significantly changed the conceptualisation of the Fan Sediments aquifer. These works have addressed a number of key assumptions that were required during construction of the Stage 1 geological model. Resolved conceptual uncertainties include:

- The definition of groundwater flow direction and hydraulic gradients;
- Increased certainty regarding basin geometry and associated aquifer thickness;
- Improved understanding of aquifer extents, inflows, and outflows; and
- Definition of lateral and vertical hydraulic continuity of the aquifer, including the distribution of hydraulic parameters.

Increases in aquifer thickness and the lateral extension of the aquifer into Afghanistan has significantly increased the estimated volume of groundwater stored within the Fan Sediments aquifer. Conversely, definition of groundwater flows towards the Afghanistan border introduces potential transboundary drawdown impacts which will need to be managed during operation of the proposed Baghicha Borefield.

Conceptual hydrogeological outputs and subsequent geological model construction have allowed the creation of a probabilistic numerical modelling tool by which to assess the Fan Sediments groundwater system. This tool may be used to perform additional works, such as borefield optimization exercises, or assessing future abstraction scenarios. The geological model and underlying numerical model may continue to be revised with inputs from further investigations and early works.

7.1 Uncertainties

There is limited hydraulic testing at depth within the Fan Sediments aquifer. Investigations of changes in hydraulic parameters at depth are limited to testing of core material. Vertical continuity of aquifer properties beyond a nominal 300 m bgl is not currently verified through field testing i.e., long-term test pumping. Further investigations may change the aquifer conceptualisation at depth.

The confining clay unit overlying the Fan Sediments aquifer has been included to maintain artesian pressures, as observed at Imtiaz Bore. Lithological logging, groundwater contouring, elevation data and satellite imagery were used to determine approximate areal extent. Given the clay layer is predominantly located within Afghanistan, there is no physical validation of continuity across the border.

The thickness and extent of the confining clay layer has been defined using groundwater contours such that it is present where artesian pressures exist – the 40 m thickness adopted is relatively arbitrary. While there are no indications of gaps in the confining clay layer, such as surface expressions of groundwater, it is possible that the thickness of the confining clay layer may influence vertical groundwater flow rates and have implications for the conceptual water balance.

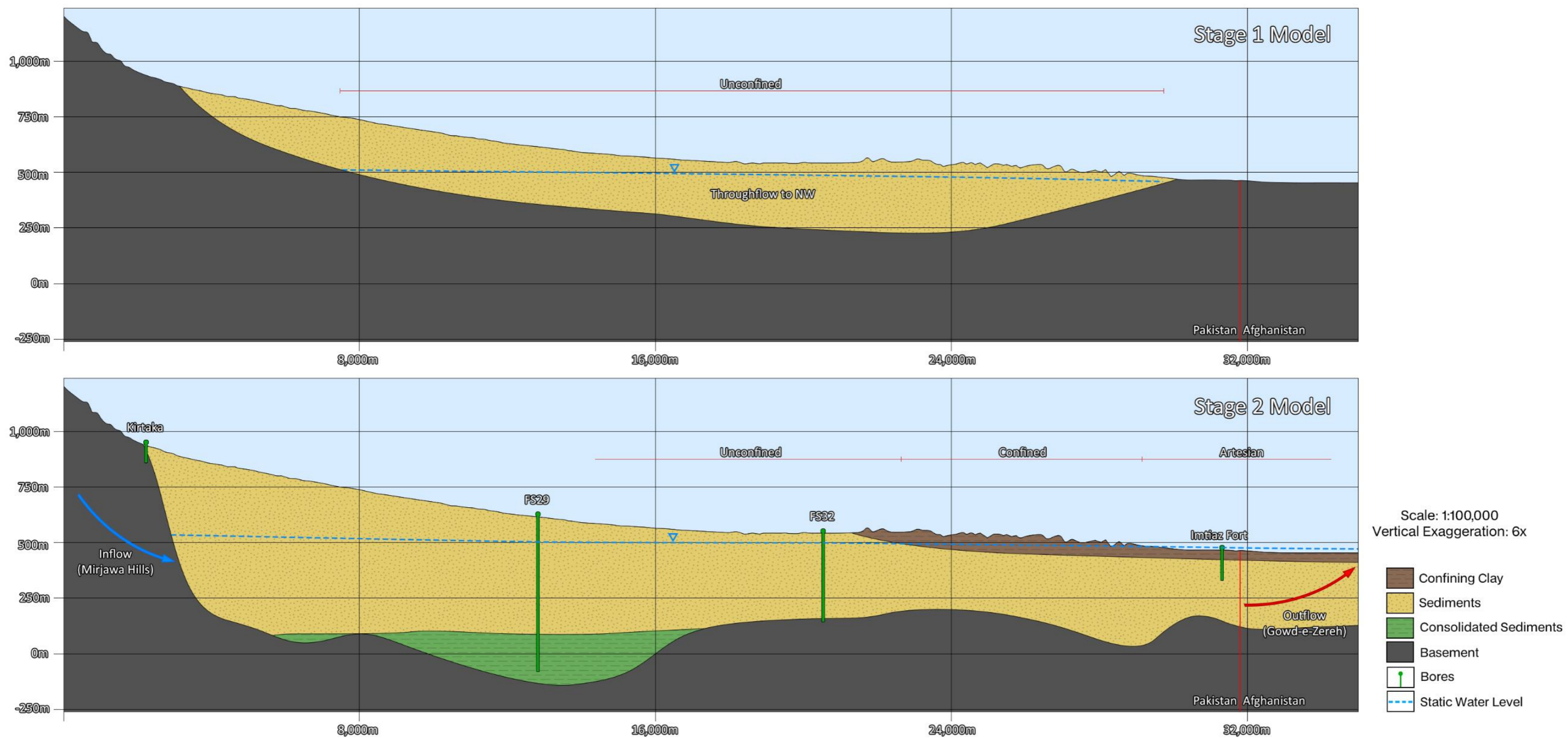


Figure 23: Comparison Between Stage 1 and Stage 2 Conceptual Models - Cross-section

The fluvial to lacustrine depositional environment described beyond the piedmont slope is assumed to extend beyond the Afghanistan border and beneath Gaud-i-Zirreh. Given the characterisation of the Sistan Basin as previously hosting an inland sea or lake, sediments may become increasingly clay-dominant with proximity to Gaud-i-Zirreh. A reduction in these hydraulic parameters may effectively form a no-flow boundary along the north-eastern margin of the Fan Sediments aquifer, increasing drawdown impacts within the immediate borefield area.

Basin geometry and associated aquifer thickness outside of the investigation area is derived from coarse (5 x 5 km) satellite gravity data. This interpreted basement surface is not possible to validate through field investigations, due to access constraints. Changes in basin geometry and associated aquifer thickness may change groundwater volumes, and the spatial distribution of drawdown impacts.

Finally, water balance components (inflow, throughflow, and outflow) are poorly defined. Groundwater outflows were estimated using a specific discharge value and the inferred extent of discharge to Gaud-i-Zirreh. Groundwater inflows were subsequently matched to these values to maintain a steady-state water balance. While these estimated water balance parameters currently result in a good match with calibration targets, additional recharge, throughflow and discharge investigations will facilitate a reduction in conceptual uncertainty. These may lead to changes in expected ranges of hydraulic parameters or require reassessment of the underlying conceptual model.

8. References

Darkwater Consulting Pty Ltd, 2024. *Gaud-i-Zirreh Surface Water Assessment*. Unpublished memorandum for RDMC, February 2024.

Groundwater Consulting Pty Ltd, 2024. *Barrick Gold: Reko Diq Mine Water Supply: Fan Sediments Water Supply Modelling – Stage 2*. Unpublished Report for RDMC, May 2024.

Hagler Bailly Pakistan Pvt Ltd, 2023. *Reko Diq Mining Project, Hydrocensus Report – 2023 Survey*. Unpublished report for Digby Wells Environmental, August 2023.

SMEC Australia Pty Ltd, 2024a. *Reko Diq Water Supply Feasibility Study Update: Fan Sediments Hydrogeological Factual and Interpretive Report – Phase 1*. Unpublished report for RDMC, April 2024.

SMEC Australia Pty Ltd, 2024b. *Reko Diq Water Supply Feasibility Study Update: Fan Sediment Geophysical Factual and Interpretive Report – Phase 1*. Unpublished report for RDMC, April 2024.

SMEC International Pty Ltd, 2009. *Reko Diq Water Resource Assessment Feasibility Study*. Unpublished report for Tethyan Copper Company Ltd (TCC), December 2009.

Appendix A – Fan Sediments Water Supply Modelling – Stage 2 (GWC, 2024)