Annex B

Primary Baseline Study Methodologies

B1 WATER STUDY

This *Section* details the methodology applied for the fieldwork conducted by ERM during the site visits in November 2013 and February 2014, including the hydrocensus and two rounds of groundwater sampling.

B1.1 HYDROCENSUS

A detailed hydrocensus field survey was conducted within a radius of 10km of the three concession areas defined in *Chapter 2* (namely the North Musley, Musley and Crescent Concessions) to comprehensively identify sensitive receptors and to confirm the extent of community reliance on local groundwater resources. The aim of the hydrocensus survey was to compile a complete inventory of available groundwater monitoring points, groundwater and surface water abstraction points and a comprehensive groundwater level survey of the area under investigation. This involved locating specific boreholes, hand pumps and hand-dug wells that are currently used by communities, and confirming the purposes for which the groundwater is used.

During the hydrocensus survey, the following data were recorded on a field sheet for each surveyed point:

- Geographic coordinates (WGS84, UTM 37N), recorded using a hand-held GPS;
- Depth to groundwater;
- Borehole, well depth;
- Type and condition of the pumping equipment used if any;
- The groundwater use (i.e. irrigation, livestock watering or domestic); and
- Where possible a photograph was taken.

B1.2 GROUNDWATER LEVEL MONITORING

A programme of monthly groundwater level monitoring was initiated during the first site visit in November 2013 in order to redress the lack of groundwater level monitoring data in the Project Area. Manual water level dips were measured in November 2013 by ERM and monthly from February 2014 until October 2014 by Yara Dallol BV using a dip meter.

Groundwater levels in Dallol Test Well (DTW)-01 to DTW-03, DTW-05, DTW-06 and DTW-10 were also monitored during the same period using Solinst pressure transducer data loggers. The logger data were calibrated using the manual dip measurements. Groundwater level monitoring was primarily geared to investigate seasonal groundwater level fluctuations and response to rainfall events/flash-floods.

Unfortunately, although monitoring of DTW-04 was attempted using more than one data logger (by ERM and MWH), no data was obtained due to multiple data logger failures of more than one manufacturer. It is speculated that that the high concentrations of Boron in this well chemically attacked the transducer quartz crystal window causing the failures (MWH, 2014).

In addition the data logger monitoring in DTW-01 and DTW-10 was prevented once the pumps were installed for the extraction in DTW-01 for the pilot tests and the DTW-10 pumping test. Also, the data logger placed in DTW-02 in November 2013 was found missing when ERM returned to the field to download the data in February 2014. The logger previously placed in DTW-01 (removed due to commencement of pilot tests), was placed in DTW-02 on the 17th of April 2014, hence logger data for DTW-02 is only available from this date.

B1.3 GROUNDWATER SAMPLING

Groundwater samples were collected from existing monitoring boreholes and hydrocensus boreholes and wells, as well as from one spring. Depending on site specific conditions and available field equipment, the samples were retrieved using a bladder pump, WASP pump or open ended bailer. Groundwater sampling of deep monitoring wells with deep water levels (>30 -50 m bgl) requires specialised pumps which have limited portability and were not available on-site, hence ERM attempted to use a bladder pump, which proved to be too slow, and finally resorted to bailing. The samples obtained by bailing are likely to represent groundwater present within the well close to the water table, and may not be representative of regional groundwater conditions. In addition, the DTW wells were constructed with screens at multiple levels, and samples from these boreholes are likely to be mixtures of water from different aquifers. Details of sampling methods and approximate depths of sampling are included in *Table 1.1*.

Table 1.1 Details of Groundwater Sampling Methods

BH ID	Sampling Method		Well Depth	SWL Nov-13	Approximate Sampling Depth
	November 2013	February 2014	(m brp)	(m brp)	(m brp)
DK-11-WW-1	Bladder Pump	WASP pump	8.9	1.5	4.0
DK-11-WW-2	Bladder Pump	WASP pump	6.0	5.4	5.8
DTW-01	Bailer	Bailer	162	99	102
DTW-02	Bailer	Bailer	214	145	148
DTW-03	Bailer	Bailer	88	43	46
DTW-04	Bailer	Bailer	250	133	136
DTW-05	Bladder Pump, Bailer	Bailer	150	48	50
DTW-06	Bailer	Bailer	145	39	41
DTW-07	Bailer	Bailer	250	39	42
DTW-08	Bailer	Bailer	171	26	28

BH ID	Sampling Method		Well Depth	SWL Nov-13	Approximate Sampling Depth
	November 2013	February 2014	(m brp)	(m brp)	(m brp)
DTW-09	Bailer	Bailer	249	25	28
DTW-10	Bailer	Bailer	130	80	82
YHBH01	Tap	Tap	NA	NA	NA
YHBH02	Bladder Pump	Pump stuck	49	19	21
YHW01	Community bucket	Community bucket	3.9	2.5	2.5
YHW02	Community bucket	Bailer	1.2	1.1	1.1

Where possible, boreholes were purged until field parameters stabilised, i.e. three consecutive readings of pH, temperature, electrical conductivity (EC) and oxidation – reduction potential (ORP) were within the following stabilisation criteria:

- +/- 0.2 pH units;
- +/- 1°C of average temperature readings;
- +/- 3% for EC; and
- +/- 10mV for ORP.

Once the purging was complete, groundwater sampling was conducted following strict ERM Standard Operating Procedures (SOP) broadly based on the USGS National Field Manual for the Collection of Water-Quality Data (USGS, 2006). A final set of stabilised field parameters was recorded on the sampling fieldsheet including pH, temperature, EC and ORP.

Samples were collected directly from the pump/bailer with the groundwater being discharged directly into the appropriate laboratory supplied sample container. For analysis of trace elements (metals), samples were field filtered using a 0.45 µm nylon membrane filter before discharging into laboratory supplied pre-acidified sample container. Samples were adequately sealed and packed on ice to maintain a temperature of below 4°C at all times.

Additionally, during each sampling round, two sets of duplicate samples were collected and submitted to the laboratory. A duplicate sample comprises the collection of an additional sample at a specific location, which is analysed for the same analytes as the original sample.

Groundwater samples were submitted to Jones Environmental Laboratory in the United Kingdom, following strict chain-of-custody protocol, for analysis of the following:

- pH;
- EC;
- TSS;
- Alkalinity;
- Major cations (Ca, Mg, Na, K);

- Major anions (Cl, NO_3, SO_4, F, ortho-PO_4);
- Trace elements, (Al, As, B, Cd, Co, Cr, Cu, Fe, Pb, Mn, Mo, Ni, Se, U, V, Zn);
- Selected samples for isotopes (Oxygen-18, Deuterium and Tritium) (November 2013 sampling event only); and
- Selected samples for radiocarbon (February 2014 sampling event only).

B1.4 QUALITY ASSURANCE AND QUALITY CONTROL

B1.4.1 Charge Balance Assessment

A charge balance assessment was conducted to assess the quality of the data. As water is an electrically neutral solution, the sum of charge due to cations should balance the sum of charge due to anions. An acceptable charge balance error (CBE) is usually <10%.

Of the samples collected during the November 2013 sampling round (*Table 1.2*), three slightly exceeded the acceptable CBE by less than 1%, and one sample (DK-11-WW-1) had a CBE of 26.7%. Sample DK-11-WW-1 and its duplicate (DUP04) collected during the February 2014 sampling round (*Table 1.3*) also demonstrated elevated CBEs, of 28.8% and 25.3%, respectively. These samples have the highest salt concentrations, and the charge imbalances may be a result of dilutions required to measure such high concentrations, or due to not measuring an ion that becomes enriched in saline environments.

B1.4.2 Duplicate Sample Results

Relative percentage differences (RPDs) provide a measure of the precision of the laboratory results, and have been calculated for the analytical results of the duplicate water samples. RPDs are calculated as the percentage of the difference between two duplicate samples divided by the average of the two samples and is expressed by the equation below:

$$\% \text{ Difference} = \left| \frac{x_1 - x_2}{(x_1 + x_2) / 2} \right| \text{ x } 100$$

Where:
X_1 = Primary sample concentration
X_2 = Duplicate sample concentration

ERM specifies an acceptable RPD level of < 100% where analytes are detected in the same order of magnitude as the detection limits. Where analytes are detected at levels greater than an order of magnitude above the detection limits, the acceptable RPD level is specified at < 50%.

During the November 2013 sampling round, duplicate samples DUP01 and DUP02 were collected from primary samples DTW-05 and YHW01 respectively, and submitted for analysis. The calculated RPDs are presented

in *Table 1.2*. During the February 2014 sampling round, duplicate samples DUP03 and DUP04 were collected from primary samples DTW-05 and DK-11-WW-1, respectively and submitted for analysis. The calculated RPDs are presented in *Table 1.3*.

Results indicate a high level of precision for the duplicate samples collected during both sampling rounds, with most RPDs within 10%. In summary, the laboratory QC results indicate that the data are acceptable for the purpose of this investigation.

Table 1.2 RPD Calculations - November 2013

Analytes	Level of Detection	Units	DTW-05	DUP01	RPD (%)	YHW01	DUP02	RPD (%)
Electrical Conductivity @25C	<2	mS/m	172.90	179.70	**1.0**	150.40	155.80	**0.9**
Total Suspended Solids	<10	mg/l	14	BDL	**-**	86	98	**3.3**
Dissolved Calcium	<0.2	mg/l	166.6	169.2	**0.4**	113.3	117.1	**0.8**
Dissolved Magnesium	<0.1	mg/l	66.6	73.2	**2.4**	24.2	24.9	**0.7**
Dissolved Sodium	<0.1	mg/l	130.3	115.7	**3.0**	159.4	163.6	**0.7**
Dissolved Potassium	<0.1	mg/l	12.2	11.6	**1.3**	16.5	17.7	**1.8**
Chloride	<0.3	mg/l	94.5	93.7	**0.2**	181.8	182.6	**0.1**
Nitrate as NO_3	<0.2	mg/l	BDL	BDL	**-**	20.2	21.3	**1.3**
Sulphate	<0.05	mg/l	243.65	243.79	**0.0**	268.76	263.64	**0.5**
Fluoride	<0.3	mg/l	0.3	BDL	**-**	1.2	1.5	**5.6**
Ortho Phosphate as PO_4	<0.06	mg/l	BDL	BDL	**-**	BDL	BDL	**-**
Total Alkalinity as $CaCO_3$	<1	mg/l	580	658	**3.2**	186	195	**1.2**
Carbonate Alkalinity as $CaCO_3$	<1	mg/l	BDL	BDL	**-**	BDL	BDL	**-**
Bicarbonate Alkalinity as $CaCO_3$	<1	mg/l	580	658	**3.2**	186	195	**1.2**
Dissolved Aluminium	<1.5	ug/l	BDL	BDL	**-**	BDL	BDL	**-**
Dissolved Arsenic	<0.9	ug/l	11.3	8.2	**7.9**	3	BDL	**-**
Dissolved Boron	<2	ug/l	391	395	**0.3**	750	744	**0.2**
Dissolved Cadmium	<0.03	ug/l	BDL	BDL	**-**	BDL	BDL	**-**
Dissolved Cobalt	<0.1	ug/l	0.2	1.1	**34.6**	BDL	BDL	**-**
Total Dissolved Chromium	<0.2	ug/l	BDL	BDL	**-**	BDL	0.3	**-**
Dissolved Copper	<3	ug/l	BDL	BDL	**-**	BDL	BDL	**-**
Total Dissolved Iron	<4.7	ug/l	14.8	92.9	**36.3**	BDL	BDL	**-**
Dissolved Lead	<0.4	ug/l	29	31.4	**2.0**	9.7	10.4	**1.7**
Dissolved Manganese	<1.5	ug/l	290.5	320.3	**2.4**	174.1	177.8	**0.5**
Dissolved Molybdenum	<0.2	ug/l	1	0.4	**21.4**	8.2	8.2	**-**
Dissolved Nickel	<0.2	ug/l	BDL	BDL	**-**	BDL	BDL	**-**
Dissolved Selenium	<1.2	ug/l	BDL	BDL	**-**	BDL	BDL	**-**
Dissolved Uranium	<5	ug/l	BDL	BDL	**-**	BDL	BDL	**-**
Dissolved Vanadium	<0.6	ug/l	6.4	3.5	**14.6**	6.8	7.6	**2.8**
Dissolved Zinc	<1.5	ug/l	93.2	67.6	**8.0**	BDL	BDL	**-**

Notes: **-** RPD value could not be derived because one or both of the constituents detected were below laboratory's level of reporting

Table 1.3 RPD Calculations - February 2014

Analyte	Level of Detection	Units	DTW-05	DUP03	RPD (%)	DK-11-WW-1	DUP04	RPD (%)
Electrical Conductivity @25C	<2	mS/m	161.7	163	**0.2**	23,852.8	24,073.5	**0.2**
Total Suspended Solids	<10	mg/l	58	56	**0.9**	2,714	2,225	**5.0**
Dissolved Calcium	<0.2	mg/l	157.4	157.8	**0.1**	15,940	15,960	**0.0**
Dissolved Magnesium	<0.1	mg/l	71.7	67.3	**1.6**	10,040	10,010	**0.1**
Dissolved Sodium	<0.1	mg/l	149.9	104.9	**8.8**	91,540	89,390	**0.6**
Dissolved Potassium	<0.1	mg/l	13.5	11.2	**4.7**	5,088	5,161	**0.4**
Chloride	<0.3	mg/l	84.4	97.3	**3.5**	118,791.2	118,934.1	**0.0**
Nitrate as NO_3	<0.2	mg/l	4.4	4.4	**0.0**	BDL	BDL	**-**
Sulphate	<0.05	mg/l	257.91	273.29	**1.4**	244.01	248.03	**0.4**
Fluoride	<0.3	mg/l	BDL	BDL	**-**	BDL	BDL	**-**
Ortho Phosphate as PO_4	<0.06	mg/l	BDL	0.17	**-**	BDL	BDL	**-**
Total Alkalinity as $CaCO_3$	<1	mg/l	534	509	**1.2**	103	109	**1.4**
Carbonate Alkalinity as $CaCO_3$	<1	mg/l	BDL	BDL	**-**	BDL	BDL	**-**
Bicarbonate Alkalinity as $CaCO_3$	<1	mg/l	534	509	**1.2**	103	109	**1.4**
Dissolved Aluminium	<1.5	ug/l	2.6	BDL	**-**	3.1	3.1	**0.0**
Dissolved Arsenic	<0.9	ug/l	BDL	BDL	**-**	5.2	6.6	**5.9**
Dissolved Boron	<2	ug/l	360	368	**0.5**	24,020	23,800	**0.2**
Dissolved Cadmium	<0.03	ug/l	BDL	BDL	**-**	0.83	1.09	**6.8**
Dissolved Cobalt	<0.1	ug/l	BDL	BDL	**-**	BDL	BDL	**-**
Total Dissolved Chromium	<0.2	ug/l	BDL	BDL	**-**	BDL	BDL	**-**
Dissolved Copper	<3	ug/l	BDL	BDL	**-**	BDL	BDL	**-**
Total Dissolved Iron	<4.7	ug/l	BDL	BDL	**-**	10,140	9,464	**1.7**
Dissolved Lead	<0.4	ug/l	18.9	19.4	**0.7**	BDL	BDL	**-**
Dissolved Manganese	<1.5	ug/l	196.6	196.2	**0.1**	44,200	43,430	**0.4**
Dissolved Molybdenum	<0.2	ug/l	1.7	1.9	**2.8**	0.4	BDL	**-**
Dissolved Nickel	<0.2	ug/l	0.6	0.4	**10.0**	7	5	**8.3**
Dissolved Selenium	<1.2	ug/l	BDL	BDL	**-**	BDL	BDL	**-**
Dissolved Uranium	<5	ug/l	BDL	BDL	**-**	BDL	BDL	**-**
Dissolved Vanadium	<0.6	ug/l	1.3	1.8	**8.1**	BDL	BDL	**-**
Dissolved Zinc	<1.5	ug/l	267.4	257.9	**0.9**	37.7	32.9	**3.4**

Notes: **-** RPD value could not be derived because one or both of the constituents detected were below laboratory's level of reporting

B2 BIODIVERSITY STUDY

An ecological baseline assessment for the Yara Dallol BV concessions was compiled by Mekele University Department of Earth Sciences and their report was submitted in December 2011.

B2.1 GAP ANALYSIS

ERM conducted a Gap Analysis on the Mekele University Ecological Baseline. This Gap Analysis concluded that the report presented useful ecological data for the Project Area and surrounds over various seasons, and provides a comprehensive description of the diversity of floral and faunal species occurring there. Many species are identified and the seasonality of the site has been well represented. However, to meet international standard requirements and the IFC Performance Standard 6 in particular, the following broad data gaps were identified and needed to be addressed:

- **Habitat Assessment** – important habitats were identified, but required a classification as Modified, Natural or Critical Habitat. Dependence of these habitats on various abiotic factors such as groundwater resources were also not discussed.

- **Floral Assessment** – a comprehensive list of plant species was included and representative of the diversity. Some clarification of the species important browse was required to support an assessment of the Ecosystem Services.

- **Faunal Assessment** – a comprehensive representation of faunal species was presented, but lacked an overview of the potential occurrence of fauna and their probability of occurrence based on habitat suitability and anthropogenic disturbances.

- **Aquatic Ecology Assessment** – fish species were not identified and the description of the aquatic ecology lacked detail and significant data gaps existed.

- **Red-listed Species** – the presence of IUCN Red Listed threatened species was not considered.

- **Regional Perspective** – there was no regional perspective provided on the extent of the identified habitats. There was no assessment of regional conservation actions that have taken place or planned in the near future.

B2.2 FIELD STUDIES

Habitats were mapped by ERM and classified as either modified or natural based on the criteria presented within the IFC Performance Standard 6. Dr Teshome Soromessa, a botanist of the Centre for Environmental Science, Addis Ababa University was contracted to identify important grazing and browsing plant species in the study area and to provide an overview on the diversity and occurrence of *Acacia* tree species.

Dr Teshome Soromessa engaged with the EWCA on their current perspective and future plans for the proposed Afar National Park.

An aquatic ecologist, Prof Brook Lemma-Mamaru of the Aquatic Sciences Stream, Department of Zoological Sciences, Addis Ababa University was contracted to assess the ecological state of the aquatic habitats within the vicinity of the Yara Dallol BV concessions and surrounds, to identify the fish species present and provide an overview of the taxonomy and uniqueness of this species.

A camera trap was mounted outside of the Yara Dallol BV camp in a location frequented by various large carnivores. This camera trap was maintained by the camp staff and yielded photographic evidence of the presence of a diversity mammal and bird species.

B3.1 SOCIO-ECONOMIC STUDY

The baseline draws on a range of primary data (collected for the purpose of the proposed Project) and publically available secondary data from various sources. The primary data used in this ESIA was collected predominantly through a series of semi-structured, qualitative focus group discussions and key informant interviews. Focus group discussions were conducted with community elders, men, women and Woreda, Zonal, as well as with Kebele leaders; while and key informant interviews were undertaken with healthcare professionals. *Ad hoc* conversations and observation also formed a core component of data gathered and used in the Socio-economic Study for this ESIA. In addition, feedback received through the Scoping phase public consultation process for the Project has been used to inform the socio-economic baseline.

In order to close any potential data gaps arising due to the absence of household surveys (HHS), the focus group discussions (FGDs) and key informant interviews (KIIs) were designed specifically to gather both qualitative and some quantitative data on specific topics relating to potential socio-economic vulnerability in the socio-economic Study Area such as gender and livelihoods. Broadly the FGDs and KII covered the following topics:

- Demographic description;
- Local administrative structures and governance;
- Local economy and livelihoods;
- Education and health services and
- Local utilities and infrastructure.

Table 3.1 below provides the rationale for the use of specific data collection methods.

Table 3.1 Data Collection Method, Relevance and Target Audiences

Data Collection Methods	Justification for Method Used	Target Audience
Key informant interviews/ One-to-one interviews	• Provides detailed information through two-way communication. • Interviews are by invitation only, so it is easier to predict and prepare for the types of issues that are likely to be raised. • Allows issues to be verified, tested and solutions developed.	Woreda officials Kebele leaders Medical professionals

Data Collection Methods	Justification for Method Used	Target Audience
Focus group discussions	• Allows issues to be verified, tested and solutions developed. • Allows for more in-depth discussion and analysis of issues. • Allows for the active participation of specific individuals or groups that may be unable to contribute in more open formats. • Allows for better management of discussions on controversial or highly emotive topics.	Elders, Men, Women (in-depth knowledge of the socio-economic characteristics of the community).
Ad hoc meeting	• Allows issues to be verified, tested and solutions developed.	Any community member
Observation	-	Greater population and landscape of the Study Area

In addition no detailed HHS's were undertaken due to time availability, geographical extent and accessibility of the communities in the socio-economic Study Area and due to availability of secondary data pertaining to the Study Area.

The communities consulted were selected based on the:

- Proximity of the village to the Project Site (areas selected for the Project facilities and associated infrastructure).
- The international best practise recommended 500m buffer areas between the affected communities and Project infrastructure.
- Gathering and usage of natural resources located on the proposed Project Site.
- Villages that house the local government leaders (Kebeles).
- Levels of vulnerability (as defined by the International Finance Corporation [IFC]) to access to infrastructure, services, employment, livelihoods, poverty, health, education, and gender.

The villages and government authorities engaged are shown in *Table 3.2* below.

Table 3.2 Stakeholders Engaged from 28April to 7 May 2014

Date	Village/ Gov. Leaders	Type of Engagement
28 April 2014	Bada Admeruk	FGDs: women, elders and men
		Bada Admeruk Kebele leaders
		KIIs: Health Care Practitioner
		Local guide (to show the team areas used to collect various natural resources)
29 April 2014	Bada Ermile	FGDs: women, elders and men
		Bada Ermile Kebele leaders (for health, education, finance, agriculture, and others)
		KIIs: Health Care Practitioner
30 April 2014	Abaa/ Kulili (Elifan Kebele)	FGD: women and men
		KII: Elder
01 May 2014	Dallol Woreda	FGD: Woreda Leaders (for health, education, finance, agriculture, and others)
03 May 2014	Asagosso Baheita Kebele	FGDs: women, elders and men
	Asabuyi	FGDs: women, elders and men
05 May 2014	Musley	FGDs: women
		KII: local man, and elder (woman)
06 May	Mororo	KII: local household
	Hamad Ela	KII: local business woman and man
07 May 2014	Zonal Government	FGD/KII: Zone 2 Officials for health, education, finance, agriculture, and others

Secondary data sources used included electronica publicly available data as well as hard copy data collected from various government offices. The types of secondary data used include:

- Reports from the Ethiopian Central Statistics Agency;
- National Population and Household Census (2007);
- Reports from the African Health Observatory;
- Ethiopian Demographic Health Survey 2011;
- Previous ESIAs/ EIAs undertaken in the area; and
- Various internet sources.

B3.2 CULTURAL HERITAGE STUDY

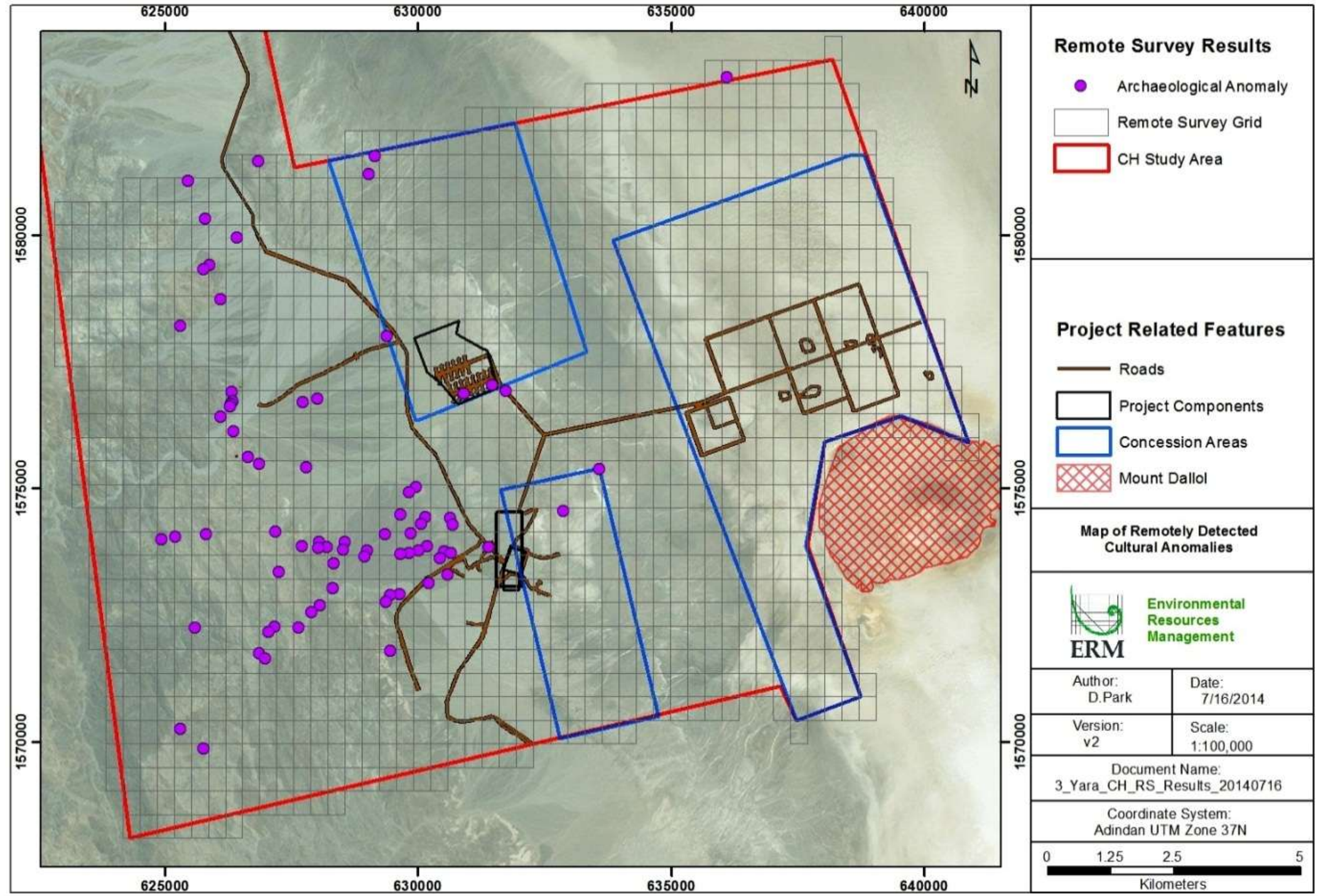
ERM's cultural heritage baseline assessment was carried out in three stages over a period of nine months. An initial scoping visit was carried out in October 2013 with the objective of assessing the Project Area and determining the most effective course of action for the follow-on and more detailed field survey. An extensive desktop analysis programme was subsequently carried out in order to inform and guide the follow-on field survey in April 2014.

B3.2.1 Desktop Results: Literature Review and Satellite Imagery Analysis

The desktop analysis carried out by ERM was comprised of two tasks – a literature review and a remote sensing survey. The literature review consulted a large number of academic, professional, and historical texts in order to determine the history of previous archaeological studies in the Project Area, and identify the types of cultural resources that might be present.

The subsequent remote sensing survey used publically available, high resolution satellite imagery, which included the following sources: Google Maps, Bing Maps, World Imagery, NASA Blue Marble and USGS Earth Explorer. In addition to the publically available imagery, the Project also provided high resolution commercial imagery (GeoEye) covering the landscape around the Project Area. The goal of the desktop analysis was to visually identify archaeological anomalies within the Project Area in order to guide the subsequent archaeological field survey. In order to accomplish this, a 1:2500 grid was set up over the study area. Imagery within each grid box was thoroughly examined for evidence of cultural heritage anomalies. In total, 76 archaeological anomalies were identified through the desktop remote sensing analysis (see *Figure 3.1*).

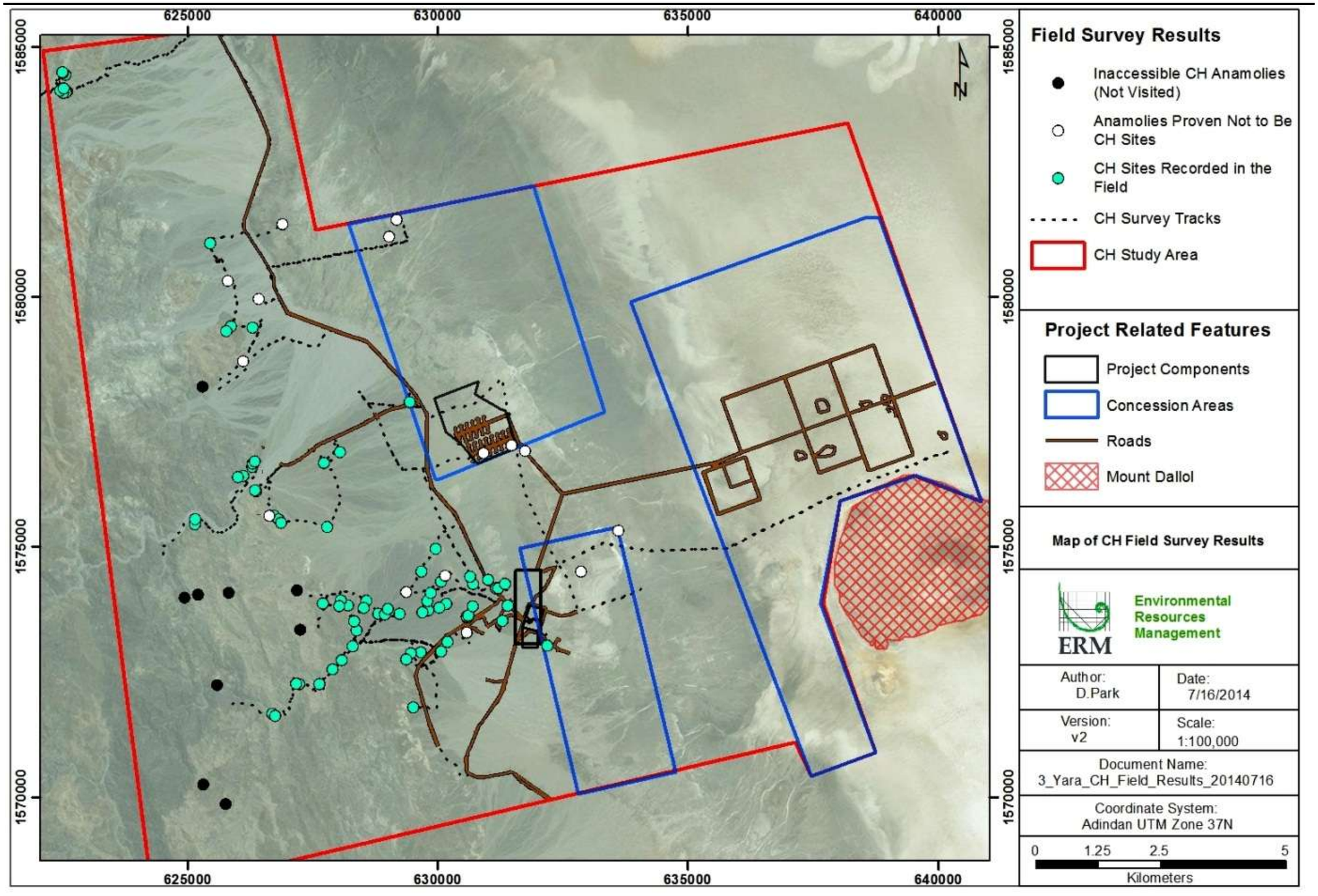
Figure 3.1 *Cultural Heritage Anomalies Identified During Remote Sensing Analysis*



B3.2.2 Baseline Field Survey Results

Guided by the results of the desktop review, ERM carried out a field survey within the Project Area. The objective of this phase of the study was to ground-truth the potential archaeological anomalies that were identified during the desktop remote sensing analysis. Ground-truthing was undertaken by field walking to the locations of the anomalies to assess and verify if they were indeed true archaeological sites. In addition, the locations of any previously unidentified archaeological sites encountered during the survey were also recorded. The ERM field survey recorded the key data - the location, age, function, size, and sensitivity - of all positively-identified archaeological sites. In total, 78 sites were identified in such manner. In the case of those remotely sensed anomalies determined not to be true archaeological sites (i.e. a natural pile of stones), this negative identification was noted, although no additional information was recorded. Also, in several cases, anomalies identified during the remote sensing effort were situated in inaccessible locations (i.e. on top of bluffs or far from passable roads) and were therefor not visited due to health and safety concerns (see *Figure 3.2*).

Figure 3.2 *Overview of Field Results from Cultural Heritage Survey*



B3.3 VISUAL STUDY

In order to collect relevant data for the assessment of actual and perceived visual impacts the ERM team conducted analysis of topographic surveys, remote sensing and site mapping to develop Zones of Theoretical Visibility (ZTVs). In field data collection was then conducted, which involved identifying potential receptors and taking photographs from a range of viewpoints.