

Consulting Services for Environmental Flows Assessment and Water Quality Modelling within the Lesotho Lowlands Water Development Project Phase II (LLWDP II) Monthly Progress Report, June and July 2021

Ministry of Water, Lesotho



August 6th, 2021

Prepared by

Multiconsult

Deltares
Enabling Delta Life



Multi - Nodal
Development Consultants

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REPORT

PROJECT	Consulting Services for Environmental Flow Assessment (EFA) and Water Quality Modelling within the Lesotho Lowlands Water Development Project Phase II (LLWDP II)	DOCUMENT CODE	10223685-TVF-MPR-006
SUBJECT	Monthly Progress Report, June and July 2021	ACCESSIBILITY	Restricted
CLIENT	Ministry of Water, Lesotho	PROJECT MANAGER	Leif Birger Lillehammer
CONTACT	Nthame Monare	EDITED BY	Leif Birger Lillehammer
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		RESPONSIBLE UNIT	Natural Resources, Multiconsult Norge AS

SUMMARY

This is the sixth monthly progress report of the *Consulting Services for Environmental Flow Assessment (EFA) and Water Quality Modelling within the Lesotho Lowlands Water Development Project Phase II (LLWDP II)*. It covers period of June and July 2021. The two months were combined into one monthly progress report due to low activity levels and Norwegian holidays in July.

After submission of the Final Inception and Scoping Report on 9th June 2021, the Consultant issued invoices for this milestone.

In the reporting period, the Consultant has undertaken a field trip at the tail end (July 30th to August 8th), to set up the cross-sections and survey in the first water levels, as well as continued with the monthly water quality monitoring.

The Consultants teams large Field trip is now planned for 30th of August to 7th September, which will also include a planned test release from Hlotse Adit, as discussed and agreed with MoW.

00	06.08.2021	Monthly Progress Report, June and July 2021	Leif Lillehammer, Filip Patocka	Leif Lillehammer	Gro Dyrnes
REV.	DATE	DESCRIPTION	EDITED BY	CHECKED BY	APPROVED BY

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Attachment

Attachment 1 Workplan

Attachment 2 Invoice log

Attachment 3 Statements from Consultant's bank receiving NOK and EUR payments for milestone payment

1 Overall status

Status for the last 3 reporting periods:

	Week 14-17, 2021		Week 18-22, 2021		This Period	
	Status	Trend	Status	Trend	Status	Trend
Financial						
Time / progress						
Quality						

Colour codes:

- Green** Status – as planned and under control, high probability of goal achievement
- Yellow** Status – a few challenges, some corrective actions needed for goal achievement
- Red** Status – major challenges, needs corrective actions, low probability of goal achievement

2 Main challenges, critical areas and proposal for measures

The main challenge for time and progress of the project is the Covid-19 pandemic. The Consultant proposed a contingency plan to outline possible strategies for coping with Covid-19 restriction scenarios. The plan is part of the submitted Inception Report.

3 Health, Safety and Environment

Internal procedures for Health, Safety and Environment of the project are in place.

4 Quality

Internal quality plan following ISO 9001:2015 has been set up to control quality on the project and will be continuously reviewed against the work being undertaken to assure satisfactory quality is achieved.

5 Risk

Internal risk procedures connected to project execution, travelling and site work had been reviewed and are in place. Further risk evaluation will be done prior to each site work period.

6 Project Activities

6.1 Meetings/Field Trip

Internal consultants meetings has been undertaken with regard to planning, especially with regard to the late July/Early August field trip (see below).

A field trip is currently undertaken with the main aim to set up the cross-sections and survey in the first water levels. Participants from our team is Karl Reinecke and Andrew Birkhead as well as the

team from Multi-Nodal. The schedule is shown below. A more detailed reporting from this trip will be included in the next progress report.

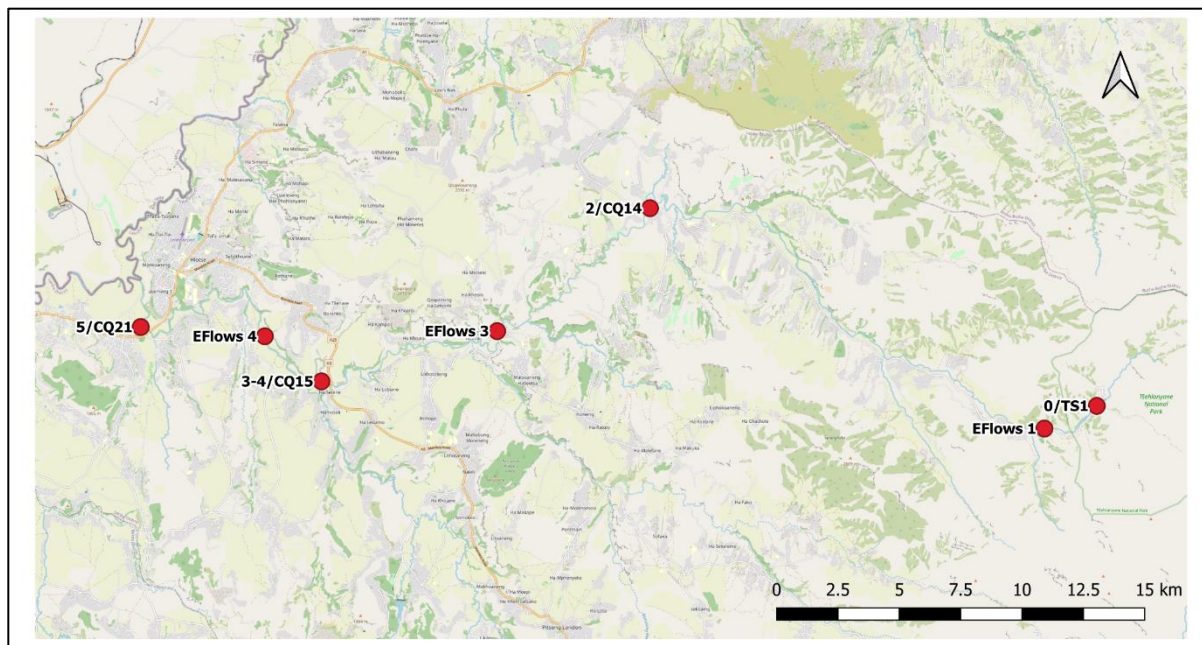
Fri 30 th July	COVID test SA PM – valid 72 hours for entry into Lesotho
Sat 31 st July	Karl travel to Jeffry's Bay – overnight
Sun 1 st Aug	Pick up Drew in EL and travel to Ficksburg – overnight
Mon 2 nd Aug	Enter Lesotho – stay Hlotse EFlow site 5
Tue 3 rd Aug	EFlow site 0, 1 – Stay Hlotse
Wed 4 th Aug	EFlow site 1, 2 – Stay Hlotse
Thu 5 th Aug	COVID test maseru AM – valid 72 hours for entry into SA EFlow site 3 – Stay Hlotse
Fri 6 th Aug	EFlow site 4 Leave Lesotho Stay over Ficksburg
Sat 7 th Aug	Travel to Jeffry's Bay, drop Drew at EL. – overnight JBay
Sun 8 th Aug	Travel to CT

6.2 Water quality monitoring

A baseline water quality monitoring programme was designed and implemented with the first set of water samples collected during the Reconnaissance Visit in March 2021.

At the same time the Multi-Nodal sampling team and Lesotho counterpart team were trained in good sampling techniques and sampling safety. Since then the sampling teams collected the samples at a monthly sampling frequency at the seven sampling points on the Hlotse River.

Month	Sample collection date
March 2021	29-30 March 2021
April 2021	19 April 2021
May 2021	24 May 2021
June 2021	14 June 2021
July 2021	19 July 2021



Location and names of Baseline Water Quality Sampling Points.

The river distances from the origin of the Hlotse River were as follows: TS1 (3.2 km), Eflows1 (6 km), CQ14 (30.4 km), Eflows3 (40.9 km), CQ15 (52.3 km), Eflows4 (56 km), and CQ21 (65.2 km).

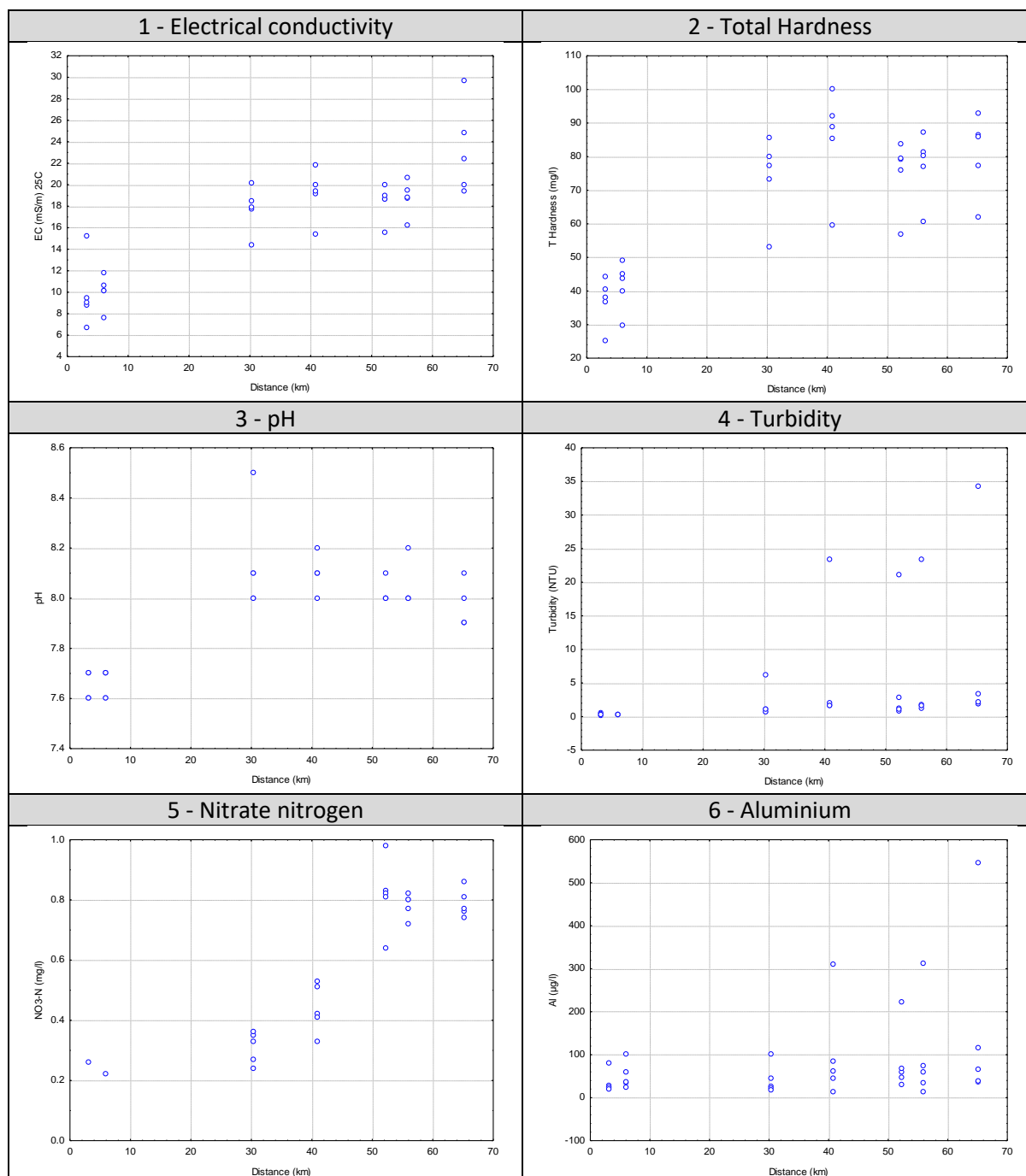
At each sampling point, in-river measurements were made, and visual observations were recorded about the state of the river at the time of sampling. In-river measurements included water temperature, electrical conductivity, total dissolved solids, dissolved oxygen concentration, dissolved oxygen saturation, oxygen reduction potential, pH and turbidity. A measurement of water clarity was also made using a turbidity tube.

Water samples were collected for chemical and microbiological analyses. Chemical analyses were undertaken at BEMLAB, the accredited water testing laboratory of the Pathcare Group, and tests for E. coli and Total coliforms were conducted as WASCO in Maseru.

The in-river measurements and visual observations, chemical analyses data, and microbiological data are all updated and stored on the Multiconsult project website¹.

An initial review of the data, plotted over distance from the origin of the Hlotse River was done and selected graphs are displayed below to indicate general water quality patterns along the length of the Hlotse River. All the monthly observations at a particular sampling point were plotted.

¹ This can be provided to the MoW via a Sharepoint folder to MoW if requested. It is however too bulky to be included in this progress report.



Water quality at the two upstream sampling points are consistently very good showing very limited human impacts.

Electrical conductivity (Graph 1), as indicator of salinity, increase in a downstream direction and at the most downstream point, CQ21, the salinity is consistently higher than at the upstream sampling points. This may indicate the impacts of wastewater effluents from the Hlotse wastewater treatment works which discharges into the river between the two most downstream sampling points, Eflows4 and CQ21. Total hardness (Graph 2) displays a similar longitudinal pattern as EC.

pH (Graph 3) also shows an increase in pH from the two most upstream sampling points but then the pH remains about the same for the next four sampling points, and a slight reduction in pH at the most downstream sampling point.

Turbidity (Graph 4) is consistently very low at the two most upstream sampling points (TS1 and Eflows1). Flows were high during the March sampling event which resulted in a marked increase in turbidity in a downstream direction. However, from about April onwards the flows were lower resulting in only a slight increase in turbidity in a downstream direction.

Nitrate nitrogen concentrations (Graph 5) show a consistent and gradual increase in concentrations in a downstream direction with high concentrations recorded at the three most downstream sampling sites (SQ15, Eflows4 and CQ21).

Aluminium concentrations (Graph 6) also shows low concentrations in the headwaters and an increase in concentration in a downstream direction, but only during the high flow sampling event in March. During subsequent sampling event there was only a very slight increase in Aluminium concentrations along the length of the river. The increase during the high flows was probably related to the presence of suspended sediment particles (turbidity) in the water.

A more comprehensive assessment of water quality patterns will be prepared for the DRIFT EFlows workshop later in the year using the baseline monitoring data as well as data collected previously by the DWA at sampling points CQ14, CQ15 and CQ21.

In August, a full set of analyses of all the water quality constituents as well as trace metals will be undertaken. This will represent a water quality conditions during the low flow month. Similar full analyses will be done at the end of the study to represent water quality conditions during the high flow months.

6.3 Planned field trip

A larger field trip is to be undertaken between 30th of August to 7th of September 2021, to coincide properly with the low-flow season that is important for most of the survey topics. Precautions due to COVID-19 will be undertaken. The field trip programme is shown in the table below, and also include the Hlotse Adit test release at the tail end.

Monday 30 th August	Team have COVID test.
Tuesday 31 st Aug	Travel from various locations in RSA to Ficksburg – overnight.
Wednesday 1 st Sep	<ul style="list-style-type: none"> Enter Lesotho (8 am latest), travel to accommodation in Hlotse and unpack. 10 am: Team meeting to discuss trip plan and view DRIFT-Hlotse. 13:30: team visits to EF Sites 3, 4, 5.
Thursday 2 nd Sep	<ul style="list-style-type: none"> Morning workshop 09:00-12:00. Data collection EFlows 2.
Friday 3 rd Sep	<ul style="list-style-type: none"> Team have second COVID test. Data collection EFlows 0, 1.
Saturday 4 th Sep	<ul style="list-style-type: none"> Data collection EFlows 3, 4.
Sunday 5 th Sep	<ul style="list-style-type: none"> Data collection EFlows 5.
Monday 6 th Sep	<ul style="list-style-type: none"> Spare day – test release
Tuesday 7 th Sep	<ul style="list-style-type: none"> Leave Lesotho. Travel home.

6.4 Schedule

The attached work plan had been updated based on the anticipated timing for the first field trip and the associated activities.

7 Interfacing

The Consultant is in contact with the Client's team through the project manager Leif Birger Lillehammer and his administrative assistant Filip Patocka.

8 Organisation and manning

Full team of Multiconsult, Deltares, Southern Waters and Multi-Nodal relevant to the delivery of the ongoing tasks has been successfully mobilised.

9 Contract

9.1 Economy

Budget as planned.

See the section 10 Disbursements and Invoicing of the monthly progress report for details about invoicing.

See the Attachment 2 for the Invoice log for details.

9.2 Delivery status

The Final Inception and Scoping report was accepted by MoW and WB on 7th of June. This report was then submitted formally on 9th June together with invoices for the second payment (see Invoice log in Attachment 2).

The list of deliverables is listed overleaf.

Deliverables	Delivery date - From the commencement of the assignment, after:
Kick-Off Meeting	18 th December 2020
Draft Inception Report	5 th February 2021
Final Inception and Scoping Report (Approved 7 th June)	Early June 2021 (9 th), after incorporating Client's comments to the report.
Regular Progress Reports	Monthly (11 reports). The first on February 10 th
Baseline Monitoring Report	9 months
Monitoring and Modelling Report	9 months
Training Manual	9 months
Water Resources and Water Quality Assessment Report	11 months
Hydraulics Report	11 months
EFlows Assessment Report	11 months
DRIFT DSS and Hlotse Database	11 months
Customised Hlotse DRIFT Manual	11 months
EFMP	12 months
Completion Report	12 months

9.3 Milestones

The second achieved milestone was delivery and approval of the Final Inception and Scoping Report.

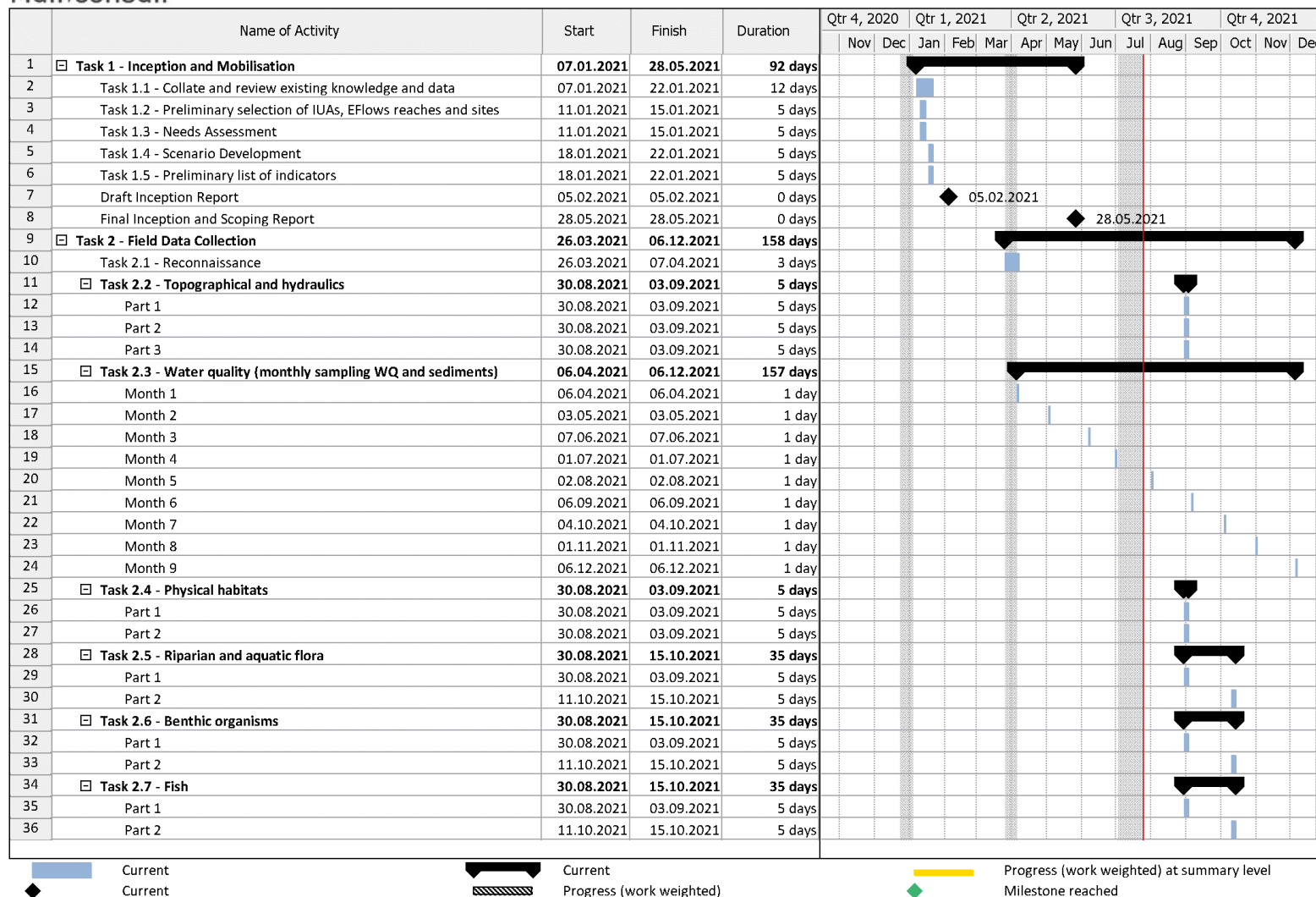
10 Disbursements and Invoicing

On 9th of June 2021, the Consultant issued invoices for the milestone related to issue of the Final Inception and Scoping Report, representing 35% of the contract amount. The invoice amount is reduced by 5% of advance payment repayment. The invoices are due on 8th of August 2021.

At the time of writing this monthly progress report, the Consultant was partially paid for NOK and EUR invoices and would like to clarify the reduction of the amount. The Consultant awaits payment for the USD part. Attached to this monthly progress report are statements from our bank receiving the reduced NOK and EUR payments.

Attachment 1 – Workplan

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**Consulting Services for Environmental Flow Assessment (EFA)
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Water Development Project Phase II (LLWDP II)**

Monthly Progress Report

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Attachment 1- Workplan

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	Name of Activity	Start	Finish	Duration	Qtr 4, 2020		Qtr 1, 2021			Qtr 2, 2021		Qtr 3, 2021			Qtr 4, 2021	
					Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct
37	Task 2.8 – Riparian Fauna – Mammals, Reptile. Amphibian and Birds...	30.08.2021	03.09.2021	5 days												
38	Task 2.9 - Socio-Economic Surveys	30.08.2021	03.09.2021	5 days												
39	<input type="checkbox"/> Task 3 - Climate and hydrological assessment	22.02.2021	08.11.2021	162 days												
40	<input type="checkbox"/> Task 3.1 - Climate Change Assessment	22.02.2021	08.10.2021	141 days												
41	Part 1	22.02.2021	19.03.2021	20 days												
42	Part 1B	30.08.2021	03.09.2021	5 days												
43	Part 2	13.09.2021	08.10.2021	20 days												
44	<input type="checkbox"/> Task 3.2 - Hydrological time series assessment	22.02.2021	08.11.2021	162 days												
45	Part 1	22.02.2021	16.04.2021	34 days												
46	Part 1B	30.08.2021	03.09.2021	5 days												
47	Part 2	13.09.2021	08.11.2021	41 days												
48	<input type="checkbox"/> Task 3.3 - Water Resources Assessment	22.02.2021	08.11.2021	162 days												
49	Part 1	22.02.2021	16.04.2021	34 days												
50	Part 1B	30.08.2021	03.09.2021	5 days												
51	Part 2	13.09.2021	08.11.2021	41 days												
52	<input type="checkbox"/> Task 4 - Hydrodynamic and ecohydraulic analyses	18.05.2021	20.10.2021	96 days												
53	Task 4.1 - Hydrodynamic model	18.05.2021	30.06.2021	31 days												
54	Task 4.2 - River hydraulics	30.08.2021	03.09.2021	5 days												
55	Task 4.2B - River hydraulics	13.10.2021	20.10.2021	6 days												
56	Task 4.3 - Eco-hydraulic study	30.08.2021	03.09.2021	5 days												
57	Task 4.3B - Eco-hydraulic study	13.10.2021	20.10.2021	6 days												
58	<input type="checkbox"/> Task 5 - Water quality assessment	18.01.2021	29.10.2021	181 days												
59	Task 5.1 - Construct water quality model	06.09.2021	29.10.2021	40 days												
60	<input type="checkbox"/> Task 5.2 - Water quality assessment	18.01.2021	29.10.2021	181 days												
61	Part 1	18.01.2021	16.04.2021	59 days												
62	Part 2	06.09.2021	29.10.2021	40 days												
63	<input type="checkbox"/> Task 6 - Environmental Flow assessment	26.04.2021	26.11.2021	137 days												
64	<input type="checkbox"/> Task 6.1 - Preparation of input time-series	07.06.2021	15.10.2021	80 days												
65	Part 1	07.06.2021	02.07.2021	20 days												
66	Part 2	20.09.2021	15.10.2021	20 days												
67	<input type="checkbox"/> Task 6.2 - Input indicators and linked indicators	26.04.2021	03.09.2021	77 days												
68	Part 1	26.04.2021	30.04.2021	5 days												
69	Part 2	28.06.2021	02.07.2021	5 days												
70	Part 3	09.08.2021	03.09.2021	20 days												
71	Task 6.3 - Set-up of Hlotse DRIFT DSS	06.09.2021	01.10.2021	20 days												
72	Task 6.4 - Construct response curves	27.09.2021	08.10.2021	10 days												

Current
Current

Current
Progress (work weighted)

Progress (work weighted) at summary level
Milestone reached

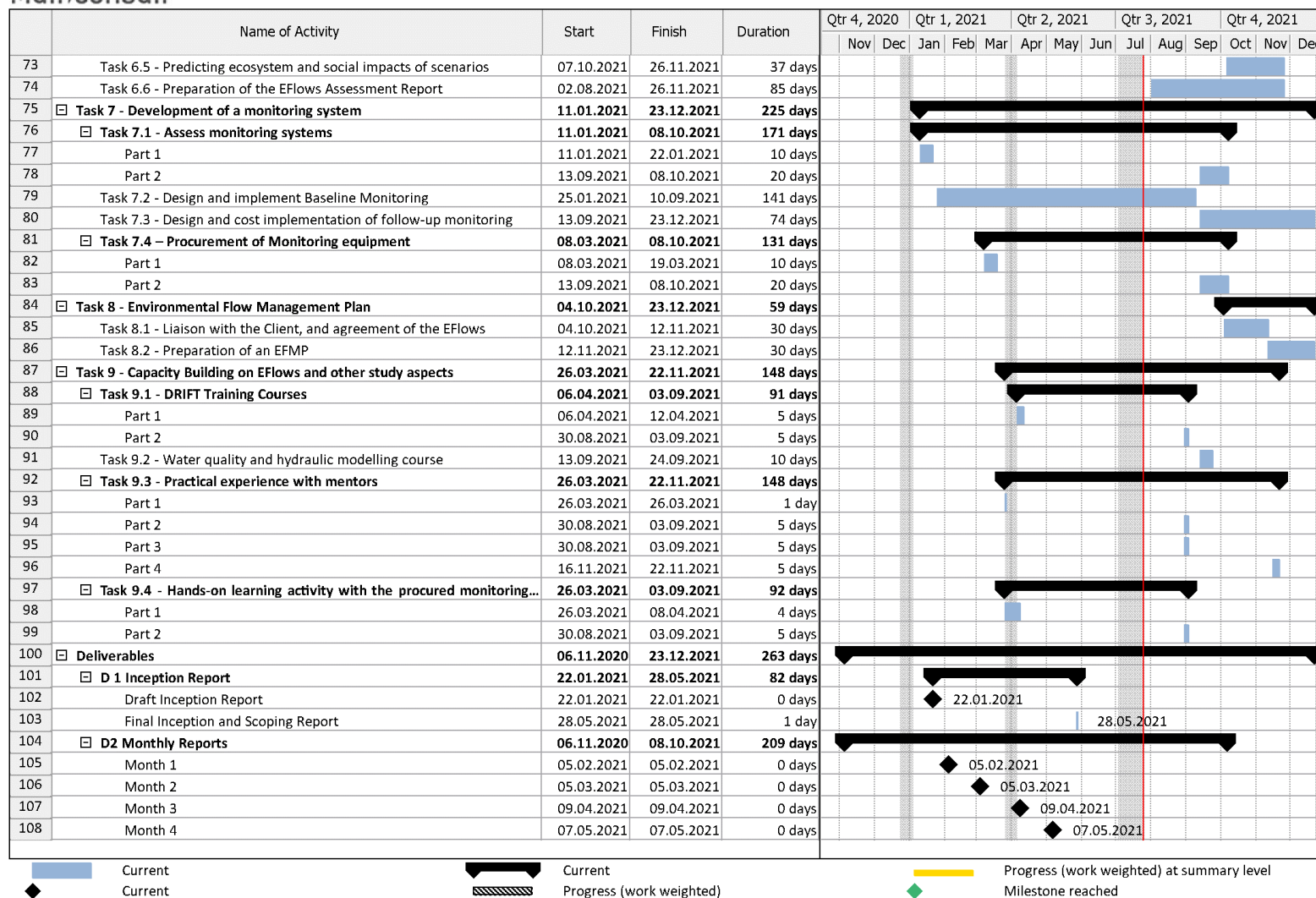
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Monthly Progress Report

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Attachment 1- Workplan

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Monthly Progress Report

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Multiconsult

	Name of Activity	Start	Finish	Duration	Qtr 4, 2020		Qtr 1, 2021			Qtr 2, 2021		Qtr 3, 2021			Qtr 4, 2021	
					Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct
109	Month 5	04.06.2021	04.06.2021	0 days												
110	Month 6+7	06.08.2021	06.08.2021	0 days												
111	Month 8	03.09.2021	03.09.2021	0 days												
112	Month 9	08.10.2021	08.10.2021	0 days												
113	Month 10	06.11.2020	06.11.2020	1 day												
114	Month 11	04.12.2020	04.12.2020	1 day												
115	<input type="checkbox"/> D3 Water Resources and Water Quality Report	19.11.2021	03.12.2021	10 days												
116	Draft	19.11.2021	19.11.2021	0 days												
117	Final	03.12.2021	03.12.2021	0 days												
118	<input type="checkbox"/> D4 Hydraulics Report	19.11.2021	03.12.2021	10 days												
119	Draft	19.11.2021	19.11.2021	0 days												
120	Final	03.12.2021	03.12.2021	0 days												
121	<input type="checkbox"/> D5 Baseline Monitoring Report	13.09.2021	01.10.2021	14 days												
122	Draft	13.09.2021	13.09.2021	0 days												
123	Final	01.10.2021	01.10.2021	0 days												
124	<input type="checkbox"/> D6 Monitoring and Modelling Report	13.09.2021	01.10.2021	14 days												
125	Draft	13.09.2021	13.09.2021	0 days												
126	Final	01.10.2021	01.10.2021	0 days												
127	D7 Training Manual	01.10.2021	01.10.2021	0 days												
128	<input type="checkbox"/> D8 Eflows Assessment Report	19.11.2021	03.12.2021	10 days												
129	Draft	19.11.2021	19.11.2021	0 days												
130	Final	03.12.2021	03.12.2021	0 days												
131	<input type="checkbox"/> D9 EFMP Report	06.12.2021	16.12.2021	8 days												
132	Draft	06.12.2021	06.12.2021	0 days												
133	Final	16.12.2021	16.12.2021	0 days												
134	D10 Completion Report	23.12.2021	23.12.2021	0 days												
135	D11 DRIFT DSS and Hlotse Database	03.12.2021	03.12.2021	0 days												
136	D12 Customized Hlotse Drift Manual	03.12.2021	03.12.2021	0 days												
137	D13 Monitoring Equipment (Delivery to the Client)	23.12.2021	23.12.2021	0 days												

Current
Current

Current
Progress (work weighted)

Progress (work weighted) at summary level
Milestone reached

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Monthly Progress Report

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Attachment 2- Invoice log

Attachment 2 – Invoice log

Consulting Services for Environmental Flows Assessment and Water Quality Modelling within the Lesotho Lowlands Water Development Project Phase II (LLWDP II)											
NOK Part											
Client	Project No	Invoice No.	Description	Amount	Invoice Date	Due Date	Status	Paid	Received Amount	Outstanding Amount	Comments
Lesotho Lowlands Water Development Project II, Ministry of Water	10223685-01	10552144	Advance Payment	NOK 200,554.00	19.02.2021	05.03.2021	Paid	Yes	NOK 200,554.00	NOK 0.00	
Lesotho Lowlands Water Development Project II, Ministry of Water	10223685-01	10567041	Milestone, Final Inception and Scoping report	NOK 300,831.00	09.06.2021	08.08.2021	Invoiced	Partially	NOK 265,734.04	NOK 35,096.96	35% - 5% advance payment repayment Amount shown is for 30% (advance payment repayment deducted)
							-				
			Sum Invoices	NOK 501,385.00					NOK 466,288.04	NOK 35,096.96	

Consulting Services for Environmental Flows Assessment and Water Quality Modelling within the Lesotho Lowlands Water Development Project Phase II (LLWDP II)											
EUR Part											
Client	Project No	Invoice No.	Description	Amount	Invoice Date	Due Date	Status	Paid	Received Amount	Outstanding Amount	Comments
Lesotho Lowlands Water Development Project II, Ministry of Water	10223685-02	10552145	Advance Payment	EUR 20,313.00	19.02.2021	05.03.2021	Paid	Yes	EUR 20,313.00	EUR 0.00	
Lesotho Lowlands Water Development Project II, Ministry of Water	10223685-02	10567042	Milestone, Final Inception and Scoping report	EUR 30,469.00	09.06.2021	08.08.2021	Invoiced	Partially	EUR 26,914.27	EUR 3,554.73	35% - 5% advance payment repayment Amount shown is for 30% (advance payment repayment deducted)
							-				
			Sum Invoices	EUR 50,782.00					EUR 47,227.27	EUR 3,554.73	

Consulting Services for Environmental Flows Assessment and Water Quality Modelling within the Lesotho Lowlands Water Development Project Phase II (LLWDP II)											
USD Part											
Client	Project No	Invoice No.	Description	Amount	Invoice Date	Due Date	Status	Paid	Received Amount	Outstanding Amount	Comments
Lesotho Lowlands Water Development Project II, Ministry of Water	10223685-03	10552146	Advance Payment	USD 82,218.00	19.02.2021	05.03.2021	Active	Yes	USD 81,675.55	USD 542.45	Received as 69 102.37EUR. Exchanged to 81 675,55USD. Invoice was 82,218 USD.
Lesotho Lowlands Water Development Project II, Ministry of Water	10223685-03	10567043	Milestone, Final Inception and Scoping report	USD 123,327.00	09.06.2021	08.08.2021	Invoiced	No		USD 123,327.00	35% - 5% advance payment repayment Amount shown is for 30% (advance payment repayment deducted)
							-				
			Sum Invoices	USD 205,545.00					USD 81,675.55	USD 123,869.45	