ENVIRONMENTAL IMPACT ASSESSMENT (EIA) FOR THE PROPOSED OUTAPI WATER TREATMENT PLANT (WTP) AND ASSOCIATED INFRASTRUCTURES, OMUSATI REGION

Proponent

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NAMWATER
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ENVIRONMENTAL SCOPING REPORT

JULY 2021

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DOCUMENT INFORMATION

Project: Construction, operation, maintenance, and decommissioning of the proposed Outapi Water Treatment Plant (WTP) and associated infrastructures.

Location: Outapi, Omusati Region

Client: Namibia Water Corporation Ltd
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Period: November 2020 – July 2021

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LIST OF ACRONYMS

BID:	Background Information Document
CBD:	Central Business District
DEAF:	Directorate of Environmental Affairs and Forestry
DWA:	Directorate of Water Affairs
DWSSC:	Directorate of Water Supply and Sanitation Coordination
EAP:	Environmental Assessment Practitioner
ECC:	Environmental Clearance Certificate
EDPM	Ethylene Propylene Diene Monomer
EIA:	Environmental Impact Assessments
EMA:	Environmental Management Act
EMP:	Environmental Management Plan
GN:	Government Notice
I&APs:	Interested and Affected Parties
MAWLR:	Ministry of Agriculture, Water and Land Reform
MEFT:	Ministry of Environment, Forestry and Tourism
MoHSS:	Ministry of Health and Social Services
MSDS:	Material Safety Data Sheet
NAMPOL:	Namibian Police
NORED:	Northern Regional Electricity Distributor
NTU:	Nephelometric Turbidity Units
ONRWSS:	Ombalantu North Rural Water Supply Scheme
ORC:	Omusati Regional Council
OTC:	Outapi Town Council
PP:	Polypropylene
PPE:	Personal Protective Equipment
uPVC:	Unplasticized Polyvinyl Chloride
VSD:	Variable Speed Drives
WHO:	World Health Organization
WTP:	Water Treatment Plant
WTS:	Water Treatment Sludge
WTW:	Water Treatment Works

EXECUTIVE SUMMARY

According to the “Water Supply Situation Assessment for Outapi Water Treatment Plant (WTP)” by Knight Piesold Consulting (2016), the current Outapi WTP has nearly reached its full capacity and additional water treatment capacity is required to respond to the future water demand and supply safe drinking water to the area. Various water treatment options were examined, including whether the capacity of the existing package plant should be increased by the addition of another package plant or a conventional (concrete) plant. Eventually, it was decided to decommission the existing package plant and construct a new conventional WTP. The proposed works include, increasing capacities of certain existing WTP components and construction of new components and associated infrastructures.

The proposed activities will trigger certain activities listed under No. 2, (No. 2.1 & 2.3,) No. 8 (8.5) and No. 9 (9.4) of Schedule 1 of the EIA Regulations (GN No. 30 of February 2012), therefore cannot be undertaken without an EIA being undertaken. Green Gain Consultants cc has been appointed as an independent environmental assessment practitioner (EAP) by the Namibia Water Corporation Ltd (NamWater), to conduct an Environmental Impact Assessment (EIA) for the proposed Outapi Water Treatment Plant (WTP).

The main objective of this EIA is to determine the potential environment impacts emanating from the construction, operation, and decommissioning of the proposed Outapi WTP. The EIA was conducted in a multidisciplinary approach and followed the Namibia’s Environmental Assessment process. Relevant environmental data have been sourced from primary and secondary sources such as personal observations during site visits, inputs from NamWater officials, inputs from stakeholders and interested and affected parties (I&APs) as well as review of relevant literatures and legal instruments.

This report constitutes an Environmental Scoping report which provide information to enable the Directorate of Water Affairs (DWA) and the Directorate of Environmental Affairs and Forestry (DEAF) to make informed decisions about the project. Moreover, an Environmental Management Plan (EMP) has been prepared and it should be read in conjunction with this Scoping report. The EMP will be used as a mitigation tool and an onsite reference document during all phases of the proposed project (planning, construction, operations, and decommissioning).

1. INTRODUCTION AND BACKGROUND

1.1 Introduction

NamWater Ltd., hereinafter referred to as the proponent, intends to expand the capacity of the existing Outapi WTP by upgrading capacities of certain components and constructing new additional infrastructures. The establishment of the proposed new Outapi WTP is necessitated by the fact that the capacity of current WTP is not sufficient to meet the current and projected future water demand of the water supply area. The proposed WTP will increase the capacity required to respond to the current and future water demand and secure the supply of safe drinking water to the area.

The proposed activities cannot be undertaken without an EIA being undertaken and an Environmental Clearance Certificate (ECC) being obtained. The EIA study identified potential environmental, safety, health and socio-economic impacts associated with the construction, operation, maintenance and decommissioning of the proposed WTP. Various mitigation measures were also proposed to avoid, mitigate, or lessen the identified negative impacts and enhance positive impacts.

1.2 Purpose of the report

This report provides details of the assessment process that was followed to address the key environmental issues and impacts associated with the development, and to document issues and concerns of stakeholders and interested and affected parties (I&APs). Furthermore, it provides background motivation, details of the proposed project, and describes the public participation undertaken and provide a list of applicable legislations.

The objective of this report, therefore, is to provide the competent authority and the regulatory authority with a comprehensive account of project's process, findings and the inputs from the I&APs, stakeholders, and commenting authorities who have participated in this EIA. Another objective is to provide details of the applicable legislative framework to ensure that the proposed WTP is undertaken in an environmentally responsible manner.

2. TERMS OF REFERENCE

The Terms of Reference (ToR) provided by the proponent requires the EAP to carry out an EIA, prepare an EMP and apply for an ECC for the construction, operation & maintenance and decommissioning of the proposed Outapi WTP and associated infrastructures.

2.1 Scope of the study

The scope of the EIA is to determine the potential environment impacts emanating from the construction, operation, and decommissioning of the proposed Outapi WTP. This EIA will ensure that the proposed Outapi WTP is environmentally sound and sustainable; that decision-making is improved through appropriate analysis of actions and their likely environmental impacts; and that stakeholders/potentially affected people are properly consulted. The study was undertaken in two linked phases:

- Phase 1: Scoping study
- Phase 2: Environmental Management Plan

The proponent and the EAP have agreed that the information provided at the Scoping level is sufficient and no specialist studies are required after completion of the Scoping process. The EAP will then submit the Scoping report and the EMP to the DWA as the competent authority and to DEA (Department of Environmental Affairs) in the Ministry of Environment, Forestry and Tourism (MEFT). The EAP will provide sufficient information to allow the MEFT to issue an ECC for the project.

2.2 EIA objectives

The aim of the study was to produce a Scoping Report and EMP report, which will provide sufficient information to enable the DEAF at MEFT to make an informed decision about the project. The information submitted to the DEA should be sufficient to enable the DEA to issue ECC. Thus, the specific objectives of this EIA are to:

- Identify potential impacts associated with the proposed activities,
- Consult potential I&APs and relevant stakeholders to solicit inputs.
- Produce a Scoping Report and EMP Report, which will provide sufficient information to enable the competent authority DWA and MEFT to make an informed decision about the project.

The report should enable decision makers to decide whether to proceed with the project as anticipated, and if so, what the implications of mitigation are likely to be. The EMP should clearly indicate how mitigation measures would be implemented to avoid or minimize negative impacts and to enhance positive impacts. Monitoring and rehabilitation measures should be properly addressed.

3. APPROACH AND METHODOLOGY

3.1 The EIA processes.

This EIA study was conducted in line with the EIA Regulations (No. 30, February 2012). This Draft Scoping report will be submitted to the registered I&APs and relevant stakeholders, after which the final Draft Scoping report will be submitted to the competent authority (DWA) and to the regulatory authority, DEAF (previously known as DEA) for record of decision.

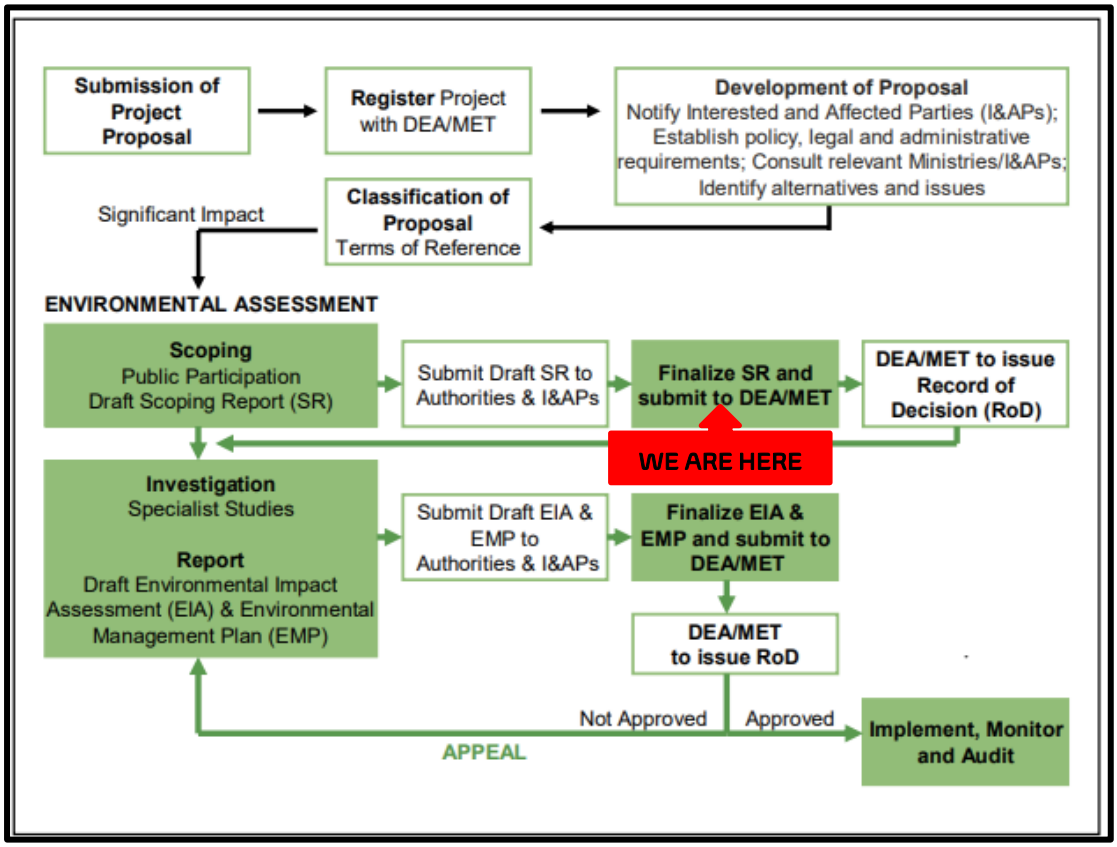

Figure 1: Namibia's EIA process

3.2 Collection of baseline information

Baseline information about the proposed development site, the receiving environment and the proposed activities were obtained from personal observation, interviewing of the Outapi WTP staff members, reviewing of existing secondary information and contributions from stakeholders and I&APs. The process that was followed is explained in detail here below.

3.2.1 Site visits

The initial site visit was conducted on the 02nd of October 2020. During the site visit, the EAP was taken through the treatment plant by the plant Supervisor Mr. Thomas Shiikwa. The EAP was provided with the description and functioning of the existing infrastructures and water treatment process. The EAP also collected baseline information on the biophysical settings of the site, in terms of local occurring flora, fauna as well as the adjacent land uses as outlined on Section 7 (7.2.6) of this report. Follow-up site visits were also conducted between November and December 2020 to collect more information.

3.2.2 Review of existing information

The Scoping process also benefited a great deal from existing relevant information. The following documents were reviewed during the scoping process.

- Situation assessment for the Outapi Water Treatment Plant (WTP), 2016 (Knight Piesold Consulting, 2016).
- Central North Water Supply Assessment Master Plan Report (Lund Engineers, 2009)
- The augmentation of the Water Supply to the Central Area of Namibia and the Cuvelai, 2014.
- Geotechnical investigation for a proposed new Outapi Reservoir in the Omusati Region (Omamanya Geotechnical Consultants, 2019).
- In addition, several relevant legislations were reviewed, and their applicability to the proposed project are outlined on Section 5 of this document.

3.3 Public participation process

The study was subjected to a public participation process as defined in the Environmental Management Act 7 of 2007 and EIA Regulations of February 2012, this is summarized below:

3.3.1 Stakeholders' consultation

The project was formally introduced to key stakeholders such as Ministry of Agriculture, Water and Forestry (MAWLR), Ministry of Health and Social Services (MoHSS), Outapi Town Council (OTC), Omusati Regional Council (ORC) and government parastatals such as Northern Electricity Distributor (NORED). The aim of these consultations was to ensure that all relevant stakeholders are aware of the development and to solicit their inputs.

3.3.2 I&APs invitation and consultation

The scoping process of the project was advertised in two local newspapers namely, New Era newspaper for the 04th and 10th November 2020 and The Namibian newspaper for 05th and 10th November 2020. Several public notices were also displayed at several public places around Outapi town and around the existing Outapi WTP fence. The public advertisements provided brief information about the proposed project and an invitation to the public meeting. See Figure 2 below and Appendix C for the proof of consultations.

Figure 2: Displayed public notices

The background information document (BID) was compiled in English and distributed to all registered I&APs and stakeholders. The BID provided a brief introduction of the proposed project, the assessment process, and the public consultation process to be followed. The period for submission of comments, started on the 04th to 27th of November 2020. This allowed for a 21-days period, in line with Section 3.4 (11) of the EIA Regulations of February 2012.

3.3.3 Consultative meetings

At the beginning of the EIA study, the consultant team and the proponent team had an inception meeting. The purpose of the meeting was for the consultant team to gain an understanding of the proponent's requirements and expectations for this study.

Furthermore, a public meeting was held on the 12 November 2020 at Outapi Town Lodge. During the meeting, the EAP introduced the project to the attendees and gave them opportunity to ask questions and make comments. The meeting was attended by representatives from the OTC, ORC, and MoHSS.

The proofs of the above consultations are contained in Appendix C, of this report. These include.

- Copies of newspaper advertisements x 4
- Attendance registers for the public meeting
- List of registered I&APs and stakeholders consulted.
- Minutes of the public meeting

3.3.4 Review of draft scoping report

This draft Scoping report will be submitted to registered I&APs as well as to relevant stakeholders for comments. Upon review by I&APs and stakeholders, the final Scoping report will be submitted to the competent and then, the regulatory authority for record of decision.

3.3.5 Summary of issues from I&APs and stakeholders

Issues that were raised during the initial public participation process are listed in the Table 1, below and were incorporated in the assessment.

Table 1: Summary of identified issues.

Platform on which the issues has been raised	Issues and concerns raised	Responses/Remarks
Telephone and email conservations.	- The water demand projections by Knight Piesold are focused more on the urban population and excluded some rural areas supplied by the treatment plant such as Anamulenge and Tsandi. - Moreover, the projections are based on old information (2015/2016), so much has happened in terms of development and many private off takes are connected to the pipes, especially in the Constituencies. In town, a lot of construction has taken place and is continuing. - Hence, the projection of 283 m^3/hour is considered too low, thus, it should be elevated between 300 m^3 to 400 m^3, to includes the current demand	- The project team has taken note of the request to increase the plant capacity to between 400-450 m^3/hr. - Our Infrastructure Planning reviewed the additional information provided but could not find any basis for increasing the capacity as requested. - Notwithstanding the above findings, the Project Team has requested the Consultant to provide NamWater with a financial proposal to carry out investigations into possible ways of making provision for the treatment plant capacity to be upgraded at a later stage.
	- The current transformer serving the plant is around 200 kVA, hence it is way too low for the proposed plant.	NORED to be requested to upgrade the transformer

	- Northern Regional Electricity Distributor (NORED) should be informed in time, incase an upgrade is required. This can be done through the NORED Engineering Department.	
Public meeting	- The water in the emergency storage dam should not be stagnant but rather be on constant flows. This will prevent the development of algae which deteriorate the physical water quality.	Algae grows only if there is excess of nutrients such as phosphates and nitrogen, there is no reason to believe there is excess algae grow in the dam.
	- The area designated for the construction of the pump station next to the canal is low-lying and prone to flooding. Hence, site accessibility mighty be difficult during rainy season or in case of flood event which might affect plant operations.	Provision has been made for the construction of an access road above the flood line. Plans must be in place to make sure the pump station is not built in the water.
	- There is a high possibility that the water flowing from the canal into the storage dam will contain fingerlings or eggs of local fish such as Tilapia and Catfish. The fish may overgrow in the dam and will attract several illegal fishermen. This will result in vandalism of the fence and NamWater properties as well as attract theft and other illegal activities in the dam area. - If possible, NamWater should investigate the possibility of trapping these eggs and prevent the potential breeding of fish in the storage dam.	Water in the storage dam will not be stagnant but on constant flow, hence there is no such possibility.
	- OTC is in the process of constructing about 450 houses while about 1000 houses are also in the pipeline. The water demand projections should consider these developments as this would increase the current population of the town.	Project Team has requested the Consultant to provide NamWater with a financial proposal to carry out investigations into possible ways of making provision for the treatment plant capacity to be upgraded at a later stage.
	- Provision must be made for parking space for customers and staff	Provision for park space will be made in the final designs
	- If possible, construction materials should be sourced from local suppliers as far as possible.	Procurement of materials will be guided by the Procurement Act of 2015.
	- Make provision for a standby generator to avoid power interruptions during the operation phase.	Recommended to the Designer/Project team.
	- NamWater should ensure regular control of reeds as they harbor mosquitoes and snakes, which poses health risks to the residents.	Recommended to the Plant Supervisor
	- The town is already experiencing water supply problems. About 2-3 water cut offs are experienced in a month. - There have been numerous complaints regarding the physical appearance of water supplied to residents. Water appears brownish which could attribute to possible health risks.	Could be manganese or Iron, or it could be corrosion of old water pipes. The recent water quality report indicates that the quality has been below the maximum threshold, hence no possible health concerns.

4. LEGAL FRAMEWORK AND REQUIREMENTS

4.1 Environmental management requirements

The proposed activities (construction, operation and decommissioning of the Outapi WTP and associated infrastructures), will trigger activities listed under the Environmental Management Act 7 of 2007 and the EIA Regulations (No. 03 of February 2012) as follows.

Table 2: The listed project activities

Proposed project activities	Activities triggered	
	Category	**Specific activity**
• **Construction of additional sludge ponds** • **management/handling of sludge.**	No. 2. Waste Management, Treatment, handling, and disposal activities	2.1 The construction of facilities for waste sites, treatment of waste and disposal of waste 2.3 The import, processing, use and recycling, temporary storage, transportation, or export of waste
• **Construction of the emergency storage dam and associated plant infrastructures.**	No. 8 Water Resource Developments	No. 8.5 Construction of dams, reservoirs, levees, and weirs.
• **Decommissioning of existing Asbestos pipes during the construction phase.** • **Use of Chlorine and other disinfectants during the operation phase.**	No. 9 Hazardous substance treatment, handling, and storage	9.4 The storage and handling of dangerous goods, including petrol, diesel, liquid petroleum gas or paraffin, in containers with a combined capacity of more than 30 cubic meters at any one location.

4.2 Applicable legislations

To protect the environment and ensure that the development is undertaken in an environmentally responsible manner, there are several environmental legislations that need to be considered.

Table 3: Applicable legislations

LEGISLATION	PROVISION	PROJECT IMPLICATIONS
Constitution of the Republic of Namibia (1990)	The articles 91 (c) and 95 (i) commits the state to actively promote and sustain environmental welfare of the nation by formulating and institutionalizing policies to accomplish the sustainable objectives which include: • Guarding against overutilization of biological natural resources, • Limiting over-exploitation of non-renewable resources, • Ensuring ecosystem functionality, • Protecting Namibia's sense of place and character. • Maintain biological diversity. • Pursuing sustainable natural resource use.	Through implementation of the environment management plan, the proponent shall be advocating for sound environmental management as set out in the constitution.
Environmental Management Act 07 of 2007	The purpose of this Act is to promote the sustainable management of the environment and the use of natural resources by establishing principles for decision-making on matters affecting the environment; to provide for a process of assessment and control of projects which may have significant effects on the environment; and to provide for incidental matters. The Act gives legislative effect to the Environmental Impact Assessment Policy. Moreover, the act also provides procedure for adequate public participation during the environmental assessment process for the interested and affected parties to voice and register their opinions and concern about the proposed project. The Environmental Impact Assessment Regulations Government Notice No. 30, promulgated on 6 February 2012. The regulations, listed certain activities that require an ECC from MEFT: DEA prior to commencing.	Application for the Environmental Clearance Certificate for the activities, will be submitted to the competent and regulatory.

Water Act 11 of 1956	The Water Act 54 of 1956 and its requirements in Terms of Water Supplies for drinking water and for Wastewater Treatment and Discharge. The Guidelines for the Evaluation of drinking-water quality for human consumption with regards to chemical, physical, and bacteriological quality requires that; water supplied for human consumption must comply with the officially approved guidelines for drinking-water quality. For practical reasons, the approved guidelines have been divided into three basic groups of determinants, namely: • Determinants with aesthetic implications: TABLE 1. • Inorganic determinants: TABLE 2. • Bacteriological determinants: TABLE 3. The water quality for human consumption is classified into three groups. The concentration of and limits for the aesthetic, physical and inorganic determinants define the group into which water will be classified. • Group A: Water with an excellent quality • Group B: Water with acceptable quality • Group C: Water with low health risk • Group D: Water with a high health risk, or water unsuitable for human consumption Water should ideally be of excellent quality (Group A) or acceptable quality (Group B), however in practice many of the determinants may fall outside the limits for these groups. If water is classified as having a low health risk (Group C), attention should be given to this problem, although the situation is not critical yet. If water is classified as having a higher health risk (Group D), urgent and immediate attention should be given to this matter. Since the limits are defined based on average lifelong consumption, short-term exposure to determinants exceeding their limits is not necessarily critical, but in the case of extremely	The Department: Applied Scientific Services is responsible for conducting microbiological analysis while the physical/ aesthetic and chlorine analyses are done at Outapi WTP. These quality testing are done on different frequency as follow. • Physical/aesthetic quality: **every two hours, daily** • Chlorine suspension: **every two hours, daily** • microbiological quality: **monthly** Results for the past six (2015-2020) years shows that, the microbiological quality of the treated water for Outapi WTP has been Group A, while Group B and C have occasionally occurred. This Act has been replaced with a new Act of 2013. However, the new Act has not come into force legally, thus the old Act still apply.

<table>
<tr><td></td><td>toxic substances, such as cyanide, remedial measures should immediately be taken.

The overall quality group into which a water is classified, is determined by the determinant that complies the least with the guidelines for the quality of drinking water. Moreover, the recommended frequency for bacteriological analysis of drinking water is as follows.

All applications in terms of Section 21(5) and 22(2), for compliance with the requirements of Section 21(1) and 21(2) of the Water Act (Act 54 of 1956) that purified water shall comply with the General Standard as laid out in Government Gazette Regulation R553 of 5 April 1962.</td><td></td></tr>
<tr><td>Water Resources Management Act 11 of 2013.</td><td>To provide for the management, protection, development, use and conservation of water resources; to provide for the regulation and monitoring of water services and to provide for incidental matters.

This Act has been passed by Parliament, but it has not yet been brought into force. It will come into force on a date set by the Minister in the Government Gazette.
The Regulations of the WRM Act also outlined the water quality guidelines and standards for potable water specified in Table 1 to Table 3.

The Regulations also specified the frequency of microbiological monitoring for bulk water supply: Table 4.

<table>
<tr><th>SIZE OF POPULATION SERVED</th><th>Turbidity 95%</th><th>MINIMUM FREQUENCY OF SAMPLING</th></tr>
<tr><td>>250 000</td><td>< 0.5 NTU</td><td>Thrice weekly ***</td></tr>
<tr><td>100 001 – 250 000</td><td>< 1.0 NTU</td><td>Twice weekly</td></tr>
<tr><td>50 001 – 100 000</td><td>< 1.0 NTU</td><td>Once weekly</td></tr>
<tr><td>10 001 – 50 000</td><td>< 1.0 NTU</td><td>Three times every month</td></tr>
<tr><td>< 10 000 reticulated</td><td>< 1.0 NTU</td><td>Once very month*</td></tr>
<tr><td>< 10 000 non-reticulated</td><td>1 - 2 NTU</td><td>Once very month*</td></tr>
</table></td><td>Although the Act has not yet been Gazetted, the department of Applied Scientific Services has started applying the new water quality guidelines and standards in 2019. However, the Outapi WTP still applying the old Regulations.</td></tr>
</table>

Namibia Water Corporation Act 12 of 1997	To establish the Namibia Water Corporation Limited; to regulate its powers, duties, and functions; to provide for a more efficient use and control of water resources; and to provide for incidental matters. Without prejudice to the generality of section 5, the Corporation shall perform the following functions in pursuit of its objects under this Act, namely – (a) Explore, develop, and manage water resources for the purpose of water supply. (b) Acquire, plan, design, construct, extend, alter, maintain, repair, operate, control, and dispose of waterworks. (c) Subject to section 7 and notwithstanding any provisions of the Water Act to the contrary, supply water to customers within and outside the borders of the Republic of Namibia. (d) Investigate, research and study matters relating to water resources, waterworks, and the environment. (e) Take such action as the Corporation may consider necessary or as the Minister may direct, for the purposes of conserving or augmenting water resources in Namibia. (f) Render services, provide facilities, and lease rights, subject to the payment of relevant charges. (g) establish training facilities and train personnel; and (h) Perform any other function as may be necessary or expedient for the achievement of the Corporation's objects.	In providing for the planning & designing, construction, operation, and maintenance of the new Outapi WTP, the NamWater is carrying out its functions as mandated by the Act.
Soil conservation Act 76 of 1969	The objectives of the Soil Conservation Act 76, 1969 are to make provision for the combating and prevention of soil erosion, and for the conservation, protection and improvement of the soil, the vegetation and the sources and resources of the water supplies. Part II, deals with soil conservation works and it further states that in section 4(1) The Minister may by means of a direction order the owner of land to construct the soil conservation works referred to in such direction either on land	Prior to the design of the proposed treatment plant, a geotechnical investigation was carried to determine the engineering properties of the soil(s) and/or rock(s) underlying the site, including the identification of potential

	belonging to such owner or on land belonging to another person, in such manner and within such period as may be mentioned in such direction, if the Minister is of the opinion that the construction of such soil conservation works is necessary in order to achieve any object of this Act in respect of the land belonging to such owner.	problem soils and the presence of an underground water table. Recommendations have been made to assist in the design of a suitable foundation for the proposed structure, thereby ensuring the conservation of the local soils.
Hazardous Substance Ordinance 14 of 1974	This Ordinance provides for the control of toxic substance and thus also relevant for pollution control. It covers for the manufacturing, sale, use, disposal, dumping, importing, and exporting of hazardous waste. Of relevance to the proposed project is the use of Chlorine and asbestos which may be classified as a Dangerous good.	Removal of asbestos pipes should be handled by company authorized by MoHSS. Chlorine and other chemicals must be handled in accordance with the respective MSDS from suppliers.
National Labour Act 11 of 2007	The objectives of the National Labour Act are. • To establish a comprehensive labour law for all employers and employees; to entrench fundamental labour rights and protections. • Regulate basic terms and conditions of employment. • Ensure the health, safety and welfare of employees and protect employees from unfair labour practices. • To regulate the registration of trade unions and employers' organization and regulate collective labour relations. • To provide or the systematic prevention and resolution of labour disputes. Some of the notable Sections under this Act are. Health and Safety Procedures Section 17 (1) The employer shall prepare any health and safety procedure referred to in sub regulation (1) in consultation with the work-place safety committee concerned. Section 21. (1) Any person who intends to commence any mining operation shall give 30 days' notice of such intention to the Minister. Section 22. (1) In the event of an accident or dangerous occurrence in or in connection with a workplace, including a mine, or if an employee dies, or suffers	The Proponent, Contractors, Sub-contractor shall all be guided by this Act when recruiting or handling employment related issues. All employees must be provided with appropriate PPE.

	a serious injury because of such an accident or dangerous occurrence, the employer shall notify and report such accident to the Chief Inspector of Labour of the area. Notification of Occupational Diseases, Section 23. If a medical practitioner finds that any person is suffering from any occupational disease listed in Annexure A. 2(1), or of any other disease that he or she believes was caused by that person's current or past employment, he or she shall immediately and in the form of Form OD. 1, report this fact to the Chief Medical Officer of Occupational Health and Safety. It shall be an unfair dismissal, or unfair disciplinary action, in terms of section 45 by an employer if such employer terminates the services of, or takes disciplinary action against, such employee, if such employee has contracted an occupational disease listed in Annexure A. 2 (1), or any other disease, because of his or her past or present employment with such employer. Section 210, states that an employer shall ensure that an employee wears or uses, to the satisfaction of an inspector, suitable and adequate personal protective equipment.	
Public and Environmental Health, 2015	Section 119 of this Act prohibits the existence of a nuisance on any land owned or occupied by the proponent. The term nuisance is important for the purpose of this EIA, as it is specified, where relevant in Section 122 as follows: a) any dwelling or premises which is or are of such construction as to be injurious or dangerous to health or which is or are liable to favour the spread of any infectious disease. b) any dung pit, slop tank, ash pit or manure heap so foul or in such a state or so constructed as to be offensive or to be injurious or dangerous to health. c) any area of land kept or permitted to remain in such a state as to be offensive, or liable to cause any infectious, communicable, or preventable disease or injury or danger to health; or	Nuisance such as dust, noise, bad odors etc. should be controlled during all project phases.

	d) Any other condition whatever which is offensive, injurious, or dangerous to health. Furthermore, in terms of Section 8 of the Public Health Proclamation 16 of 1936, where a local authority is of the opinion that a nuisance is seriously offensive or a serious menace to health, it may serve a notice on the owner or occupant of the nuisance to immediately remove the nuisance. Failure to abide by this provision is an offence.	
Atmospheric Pollution Prevention Ordinance no. 11 of 1976	This Ordinance generally provides for the prevention of the pollution of the atmosphere and for matters incidental thereto. The Ordinance deals with administrative appointments and their functions; the control of noxious or offensive gases; atmospheric pollution by smoke, dust control, motor vehicle emissions; and general provisions. Part IV of this ordinance deals with dust control. The Ordinance is clear in requiring that any person carrying out an industrial process which is liable to cause a nuisance to persons residing in the vicinity or to cause dust pollution to the atmosphere, shall take the prescribed steps or, where no steps have been prescribed, to adopt the best practicable means for preventing such dust from becoming dispersed and causing a nuisance. Of applicability to the envisaged project, is dust generated by vehicles or equipment as well as dust generated during constructions. The risk of dust generation is high at the envisaged site. This deals with air pollution as it affects occupational health and safety, and no consideration is given to the natural environment.	Air pollution during operation could occur during construction phase. It is the responsibility of NamWater to control excessive air pollution and comply with the ordinance.
Pollution Control and Waste Management Policy, 2003	The bill provide framework for a multitude administration on pollution control and waste management in the country. Each authority identified by the bill shall play its respective roles.	All waste management activities at the treatment plant are the responsibility of NamWater.
Basel and Rotterdam Convention, Framework Convention on Climate Change	Agreed to ensure environmentally sound management of hazardous waste and other wastes through the reduction of their movements, for the purpose of reducing their impacts on human health and environment.	Asbestos should be handled by a recognized and authorized company.

	The Basel Convention makes specific reference to control of special waste: sharps, pathological infectious waste, hazardous chemical waste, and pharmaceutical waste and includes the following waste categories: • Clinical wastes from hospitals, health centres, and clinics. • Wastes from the production and preparation of pharmaceutical products. • Pharmaceutical waste. • Waste from the production, formulation and use of biocides and Phyto-pharmaceuticals. Namibia has accepted the principal that the only legitimate transboundary shipments of hazardous waste are exported, where the country lacks the facilities or expertise to dispose of the waste categories. This is applicable to the transportation of radioactive waste from Namibia to South Africa. Because suitable facilities are not available in Namibia, provided that the radioactive waste is labelled, temporarily stored, and transported according to the United Nations recommended standards.	Any item labelled as radioactive should not be dumped at the local dumping site but should be transported to South Africa upon receipt of a transport permit from the MoHSS.
Stockholm Convention on Persistent Organic Pollutants	Emphasizes the restriction and elimination of on persistent organic pollutants especially the disposal of industrial and medical chemicals. It also provides information for future establishments to re-use, reduce and recycle waste with environmentally friendly technologies e.g., autoclaving. It was adopted in 2001 and entered into force on May 17, 2004.	NamWater should register all products which are labelled as POP and forward such details to the Solid Waste Management Unit of the MEFT.
Atomic Energy and Radiation Protection Act, 5 of 2005	License required for the disposal of radiation source or nuclear material Amended under hazardous substances ordinance Radioactive waste is presently transported across the borders as there is no disposal facility in Namibia.	Should there be a production of radioactive waste, an application for a disposal export permit should be obtained from MoHSS.

5. DESCRIPTION OF THE EXISTING OUTAPI WTP

5.1 Locality

The Outapi WTP is located west of the town central business district (CBD) and can be located on the following coordinates 17°30'8.52"S and 14°58'42.57"E.

Figure 3: Site locality map

5.2 Site access and surroundings

Access to the site is via the Isak Pondo Street, which is linked to the town central business district (CBD) and to the major national road networks. The site is adjacent to the Namibian Police (NAMPOL) regional headquarters on the southeast and by several houses on the northern and eastern side, while the Calueque-Oshakati canal lies approximately 300 m southwesterly of the site.

Figure 4: Site surroundings

5.3 Site context

The plant area covers approximately 3 ha of the land surface and is enclosed with a barbed wire mesh fence, approximately 2.8 m high with lockable gates. There is a guardhouse, and operator houses within the plant yard, which enable 24 hrs., control of the plant.

Figure 5: Existing site overview (Source: Google earth, 2020)

The present Outapi WTP consists of a package plant, commissioned in 2001, which replaced a batch plant, which had been in use from 1997/98. The existing WTP consists of infrastructures such as.

- Offices, Chlorine dosing room and a pump station housing various raw water and clear water pump sets.
- A treatment plant comprising of flash mixer, a flocculator and settling tanks,
- A reinforced concrete potable water reservoir,
- An elevated reservoir,
- A raw-water draw-off from the canal,
- A 70 000 m^3 raw water storage dam,
- A flocculation tower,
- Three sedimentation tanks,
- Three pressure filters, two filter feed pumps and two blowers,
- Five sludge lagoons/drying bed

5.4 Water source

Raw water is supplied to the Outapi WTP from the Calueque Dam in Angola and is transported via the Calueque-Oshakati canal with an emergency storage provided at the Olushandja Dam and an emergency storage dam (currently not use) at Outapi.

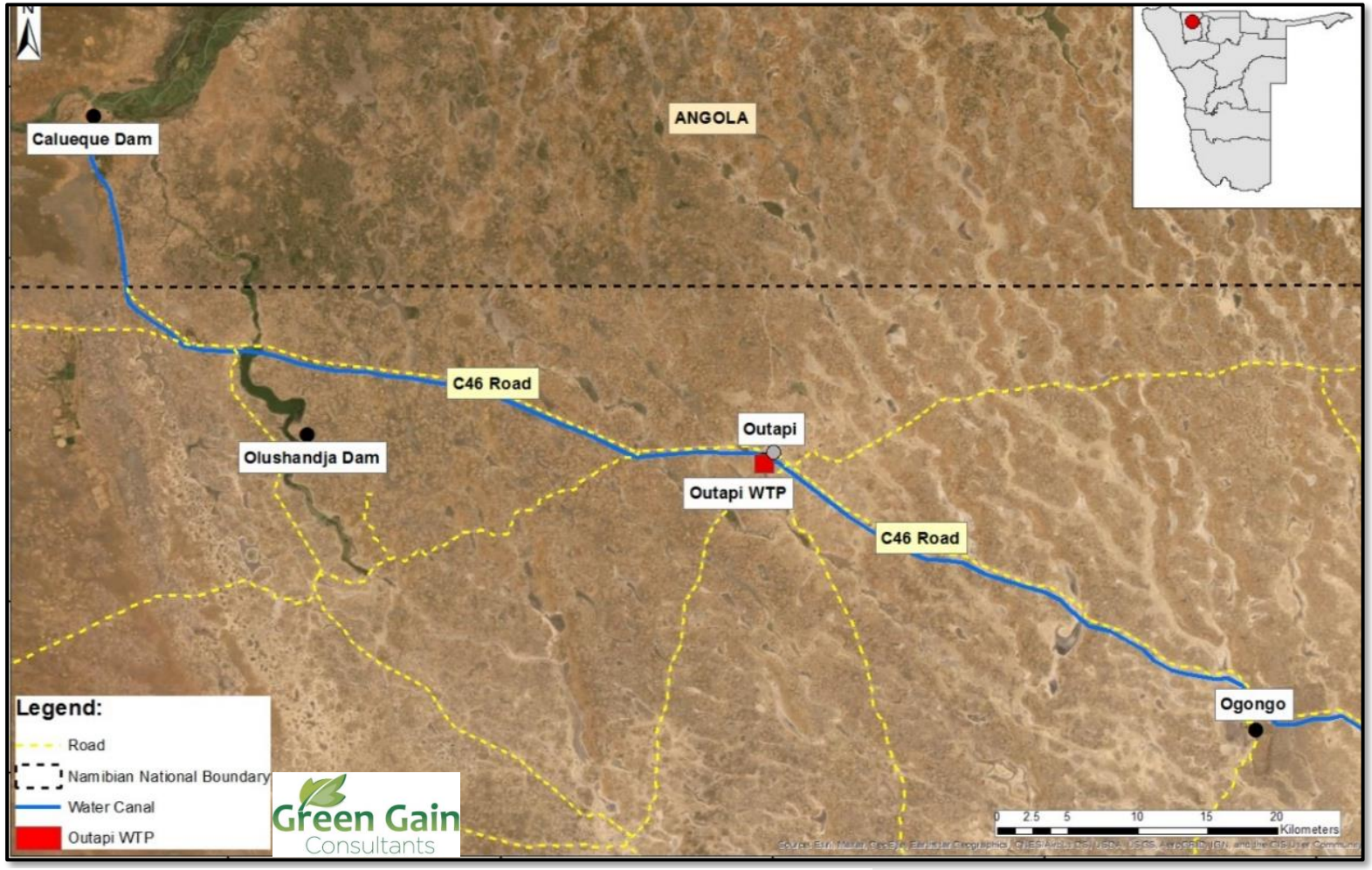

Figure 4: Water supply to Outapi WTP

5.5 Water supply area

The Outapi WTP distributes water to an area of more than 2300 hectares within the Ombalantu tribe area and surroundings, through the Outapi supply scheme and Ombalantu Northern Rural Water Supply Scheme (ONRWSS). The designed supply area is consisting of four (4) main consumer areas known as schemes, these are.

a) Outapi Town & surrounding areas (code - OMO)
b) ONRWSS Area A: Outapi to Ondukuta near Tsandi (code - ODK)
c) ONRWSS Area B: Outapi to Ontokolo in the Anamulenge constituency (code- OTL).
d) Outapi-Tsandi-Okahao (code: OHP)

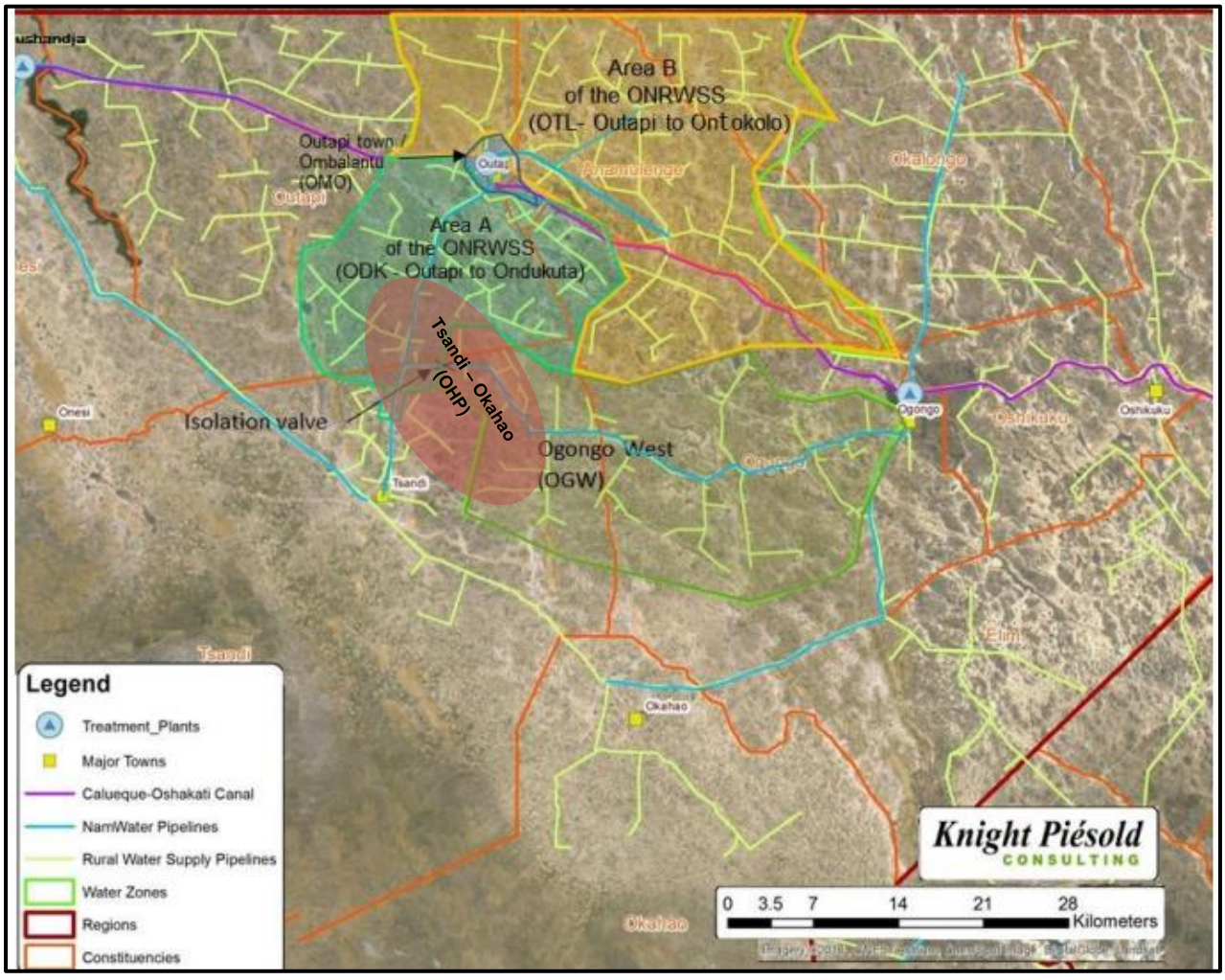

Figure 5: The Outapi WTP supply area

5.6 Quality of water supplied.

5.6.1 Water disinfection/treatment

To eliminate the pathogens that are responsible for waterborne diseases, the water supplied to the public undergo through a disinfection process. According to the World Health Organization (WHO) guidelines for drinking-water quality, several potential substances for water treatment or disinfection are available (WHO, 2004). It is therefore important that water supply agencies properly manage any chemicals that they use. Some of the water disinfectants and flocculants commonly used by the Outapi WTP are as follow.

a) Disinfectants
   - Chlorine (Cl_2) - gas
   - Chlorine (HTH) - granular

b) Flocculants
   - Medium ACH/Medium poly or Alum (medium) - liquid
   - Sudfloc - liquid
   - Zetafloc - liquid
   - Ultrafloc - liquid

5.6.2 Water quality analyses

The Water Act 54 of 1956 states that water supplied for human consumption must comply with the officially approved guidelines for drinking-water quality. The guidelines have been divided into three basic groups of determinants, namely: determinants with aesthetic implications: Table 1. Inorganic determinants: Table 2, and Bacteriological determinants: Table 3. The guidelines also stipulated the frequencies of bacteriological analysis: Table 4 and defined the group into which water can be classified listed in Table 5.

The Water Act 54 of 1956 has since been replaced with the Water Resource Management (WRM) Act 11 of 2013. This Act has been passed by Parliament, but it has not yet been brought into force. It will come into force on a date set by the Minister in the Government Gazette. The Regulations of the WRM Act 11 of 2013 also outline the water quality guidelines and standards for potable water specified in Table 1 to Table 3 and stipulate the frequency of microbiological monitoring for bulk water supply listed in Table 4.

Currently, the analysis of treated water at the Outapi WTP is accomplished in three forms, namely, physical/aesthetic analysis, chlorine (free) level and bacteriological or microbiological analysis. The physical/aesthetic and chlorine analyses are done in-house at the WTP, while the microbiological quality is done by the department of Applied Scientific Services at the NamWater head office in Windhoek.

<u>The analyses are done on several intervals as follows.</u>

- Physical/aesthetic quality: **every two hours, daily**
- Chlorine analysis: **every two hours, daily**
- Bacteriological quality: **monthly**

5.6.3 Water quality results for the Outapi WTP

a). Physical/aesthetic quality

Below are the water quality results in terms of the average nephelometric turbidity units (NTU) and free chlorine (Cl_2) levels for the Outapi WTP for the past four years (2017-2020).

Table 4: Physical water quality results for the Outapi WTP (Source; NamWater, Outapi, 2020)

Month	Period							
	2017		2018		2019		2020	
	NTU	Free Cl_2 / Liter	NTU	Free Cl_2 / Liter	NTU	Free Cl_2 / Liter	NTU	Free Cl_2 / Liter
January	-	-	3.4	-	6.9	1.1	8.6	-
February	4.2	-	5.6	0.8	0.0	-	6.7	-
March	-	-	7.4	0.7	7.8	0.9	5.9	-
April	4.2	-	6.1	0.9	7.3	0.9	9.1	1
May	6.6	-	5.4	0.6	8.0	0.7	7.4	1
Jun	4.9	-	4.5	1.5	-	-	4.7	1.8
July	3.4	-	5.7	1.1	-	-	6.9	1
August	2.6	-	4.4	1	-	-	6.1	1
September	2.5	-	4.3	0.8	5.8	1.1	3.4	1
October	2.7	-	4.9	-	-	-	4.8	1
November	4	-	4.4	1	5.8	0.8	8.0	1
December	6.0	-	5.1	1	8.0	0.8	7.4	1

The results provided for the period 2017 -2020 show that the monthly average turbidity of the treated water varied from 2.5 NTU to 9.1 NTU. The available data for the free chlorine (Cl_2) ranged between 0.6 to 1.8 mg/l. In terms of the new standards as contained in the draft Regulations of the Water Resources Management Act 11 of 2013, the monthly average turbidity was way above the recommended threshold for the acceptable standard (<0.5 NTU), whereas the monthly average free chlorine levels were within the acceptable standards (0.1-3.0 mg/l).

b). Microbiological/bacteriological quality

The average microbiological quality results for the past five years (2017-2020) in terms of free and total chlorine (Cl_2) are presented in the table below and provided in Appendix B.

Table 5: Microbiological test results for Outapi WTP (Source: Dep. of Applied Scientific Services)

Year	Free chlorine	Total chlorine
2017	0.32	0.49
2018	0.50	0.7
2019	0.53	0.71
2020	0.72	0.87

The results show that the concentration of free chlorine (Cl_2) and total chlorine (Cl_2) have been below the acceptable standard (0.1-3.0 mg/l) as per new Regulations. Other determinants such as coliforms and faecal coliforms have rarely been detected.

5.7 Water balance analysis

5.7.1 Water production and distribution

The process of supplying potable water to consumer is consisting of three main stages namely, raw water abstraction, production or treatment and distribution of final product to the respective supply schemes.

According to Ms. Agnes Shikomba, (2020) a Water Artisan at Outapi WTP, the current WTP operates for 24 hrs., a day, and 7 days a week, thus has an average raw water abstraction rate of 110 m^3 / hr., and an average production rate of 100 m^3 / hr., or 2400 m^3 / month. During the process of water production and distribution, water losses can be experienced due to various contributing factors.

a) Production losses

Production losses is the amount of water lost between abstraction and production. These losses can be attributed to backwashes, evaporation, leakages from reservoir walls or overflows. The production losses are normally higher during rainy season due to high level of turbidity in raw water due to sediments entering the freshwater canal requiring more frequent backwashes (Shikomba A, personal comm, 2020).

b) Distribution losses

Distribution losses is the amount of water lost during the distribution or supply process. These losses can be due to burst water pipes, leakages, or illegal connections etc.

Table 6: Water losses for 2016 - 2020

Categories	Period				
	2016	2017	2018	2019	2020
Abstraction (m^3)	904 211	860 568	90 8262	938 657	828 115
Production (m^3)	819 341	833 914	813 666	851 674	715 676
Avg production losses (percentage %)	15%	-	10.17%	10.29%	13%
Distribution losses (percentage %)	Data not available				

Table 6 above indicates that the annual average production rates ranged between 10% to 13% while no information is available for distribution losses, understandably due to most NamWater water meters that were not operational.

5.7.2 Water demand and consumption

a). Water demand

Table 7: Water demand for 2016 - 2020

Description	Period				
	2016	2017	2018	2019	2020
Production (m^3)	819341	833914	813666	851674	715676
Sales/consumption (m^3)	887612	1024952	1074144	1424371	1075532

Based on the table above, the current water demand for the area is estimated at about 146 M^3 per hour. The table also depicts that the sales figures for the period 2016 to 2020 were high than the production rates. This because some schemes received water from other WTPs due to capacity constraints of the Outapi WTP. Currently Ogongo WTP supply about 90% of the ODK supply scheme and 70% of the Tsandi water reservoir, while Olushandja WTP supply the remaining 30% of the Tsandi reservoir.

b). Total water consumption per scheme

As indicated in Section 5 (5.5) the Outapi WTP supply area consists of four mainly supply schemes namely.

- Outapi Town & surrounding areas (code - OMO),
- ONRWSS Area A: Outapi to Ondukuta near Tsandi (code - ODK),
- ONRWSS Area B: Outapi to Ontokolo in the Anamulenge constituency (code- OTL)
- Outapi-Tsandi-Okahao (code: OHP).

The total sales or water consumption per scheme for the period 2016 – 2020 as provided by the NamWater Outapi office is depicted in Figure 6 below.

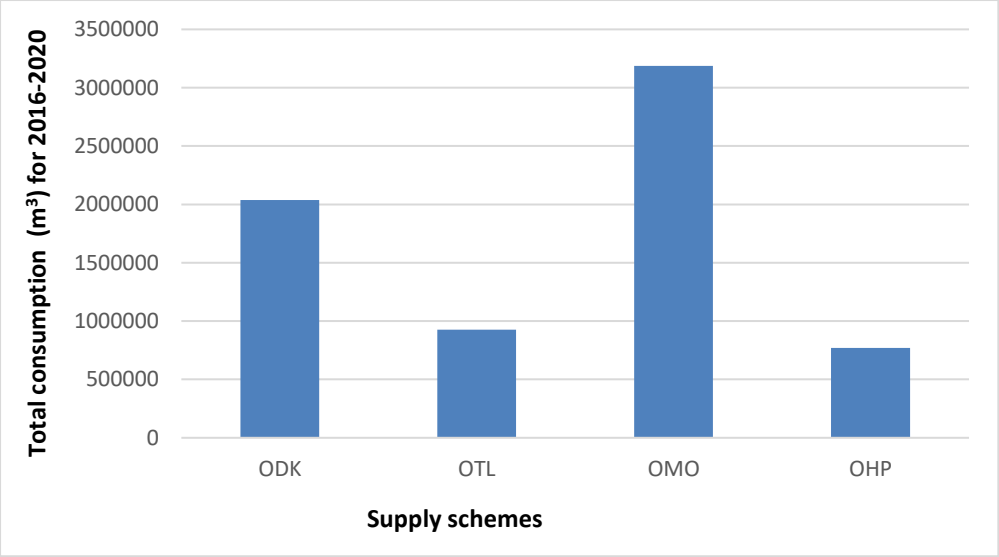

Figure 6: Total water supply per scheme

The above figures show that OMO supply scheme is the main consumer followed by ODK, while OTL is the least consumer.

c). Annual water consumption per scheme

The annual water consumption for each scheme is presented Figure 7 below. Since the OHP supply scheme was only added to the Outapi WTP supply area in 2019, there are no figures available for 2016 to 2018.

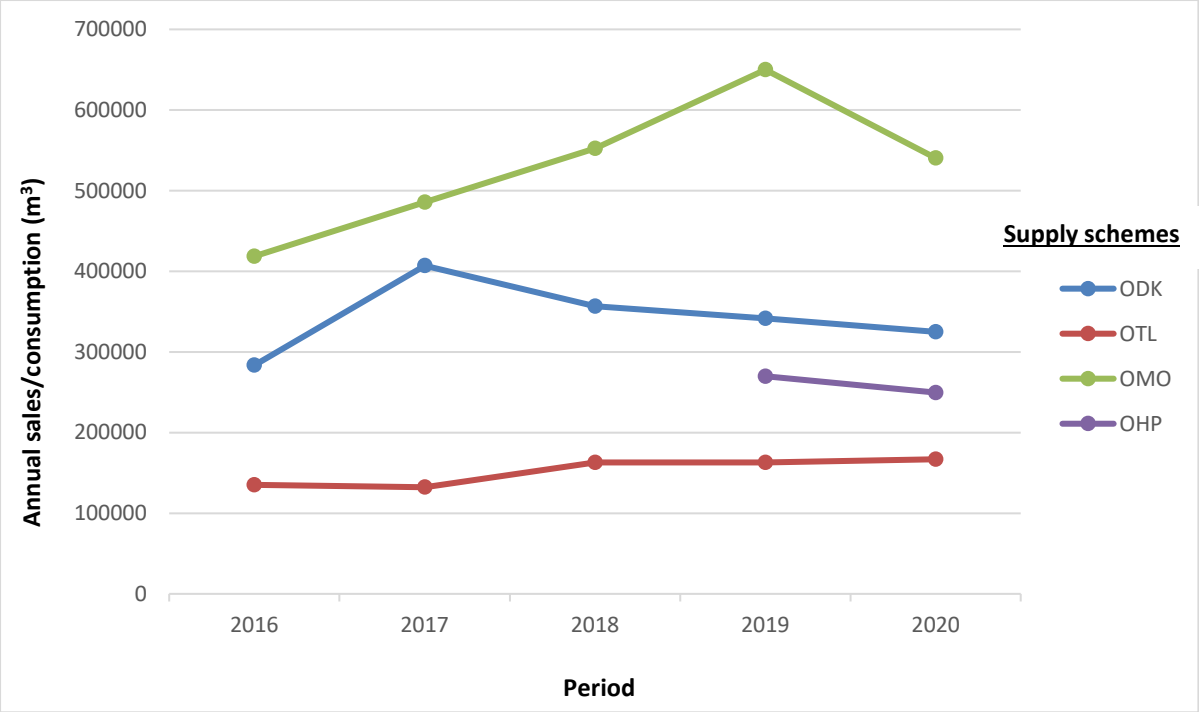

Figure 7: Annual water consumption per scheme

The water sales/consumption figures above indicate that OMO recorded a constant increase from 2016 to 2018 and a significant increase in 2019 but gradually dropped in 2020. As for ODK, the water consumption was very high in 2017 but declined between 2018 and 2020. OTL the water consumption has been slightly increasing between 2017 and 2020, while OHP the water consumption for 2020 was much lower than in 2019.

d). Water consumption for Outapi town

The town of Outapi is the main urban center in the supply area and receives water through the OMO supply scheme. Below is a comparison of water consumption for the Outapi town in relation to the water consumption for the OMO supply scheme during the period 2017 – 2020.

Table 8: Water sales figures for the OTC (Source: NamWater, Outapi, 2020).

Year	Sales to OMO (m^3)	Sales to OTC (m^3)	Percentage (%)
2017	485 821	394 188	81.14%
2018	554 285	447 514	80.74%
2019	649 945	468 874	72.14%
2020	540 671	425 083	78.62%

The results in the table above show that the annual consumption rate for the Outapi town represented about 80% of the water supplied to OMO supply scheme in 2017 and 2018 but the consumption slightly dropped below 80% in 2019 and 2020.

5.7.3 Current water issues

The current water situation in the supply area can be summarized as follows.

- There are frequent water cuts (about 2 to 3 times a week) which affect both urban and rural areas. These water cuts are mainly attributed to the shortage of supply from the Outapi WTP.
- Due to the persistent low water pressure in both rural and urban areas, some residents have resorted to the use of raw or untreated water from the canal as a way of surviving.
- Limited production and low water pressure have also forced NamWater to use water trucks to supply potable water to some rural schools.
- In some instances, the appearance of water supplied to consumers is of concern (brownish or sometimes whitish/milky-ish in color). The whitish color is attributed to the chlorination process whereas the brownish color could be due to corrosive and aging infrastructures.
- The DWSSC has reported an increase in the number of private off takers in the rural areas over the years.
- There are reported cases of illegal connections on both NamWater and DWSSC pipelines.
- Some rural areas within the supply area still do not have access to potable water, hence, depends on borehole water.

5.8 The need and desirability of the proposed treatment plant

The consumption of water in the Ombalantu area has increased substantially in recent years. The increased water demand is attributed to the growth of both urban and rural population of the supply area. The Outapi WTP is already having trouble in meeting the demand for potable water in its area of supply. The newly constructed water reservoir at Outapi WTP with a capacity of 5000 m^3 has rarely being utilized due to insufficient availability of treated water.

In addition, the Outapi WTP is unable to supply water to some of its designated supply areas. As a result, it receives back-ups from other adjacent WTP such as Ogongo WTP and Olushandja WTP. Currently Ogongo WTP supply about 90% of the ODK supply scheme and 70% of the Tsandi water reservoir, while Olushandja WTP supply the remaining 30% of the Tsandi reservoir.

Moreover, the OTC currently supply about 4000 houses in the formal areas while about 450 houses under construction and about 1000 houses are at the planning stage. The recent urban growth, reported in the 2011 census of the Outapi urban area, shows that the Outapi town has expanded beyond previous census estimates of 9.5%. This estimated population growth rate and population size is also reported to have increased over the years. OTC and DWSSC, both which are supplied by the Outapi WTP are already experiencing problems of supplying water to their respective consumers.

An investigation by Knight Piesold (2016) and confirmed by NamWater, calculated that the peak water demand of 283 m^3 / hr. will be required in 2030/31. This demand has already surpassed the capacity of the existing plant and thus an additional water treatment capacity is required to respond to the future water demand. Therefore, an additional treatment capacity is required at the Outapi WTP to improve the security of water supply to the community and ensure compliance with national water quality standards.

6. DESCRIPTION OF THE PROPOSED EXTENSION AND UPGRADE OF THE TREATMENT PLANT

6.1 Operational and control philosophy

The existing Outapi WTP is to be replaced with a new conventional surface Water Treatment Works (WTW) to cater for the future 2030 – 2031 demand. The intention is for the plant to be always manned and it shall not be possible to be operated without the presence of an operator.

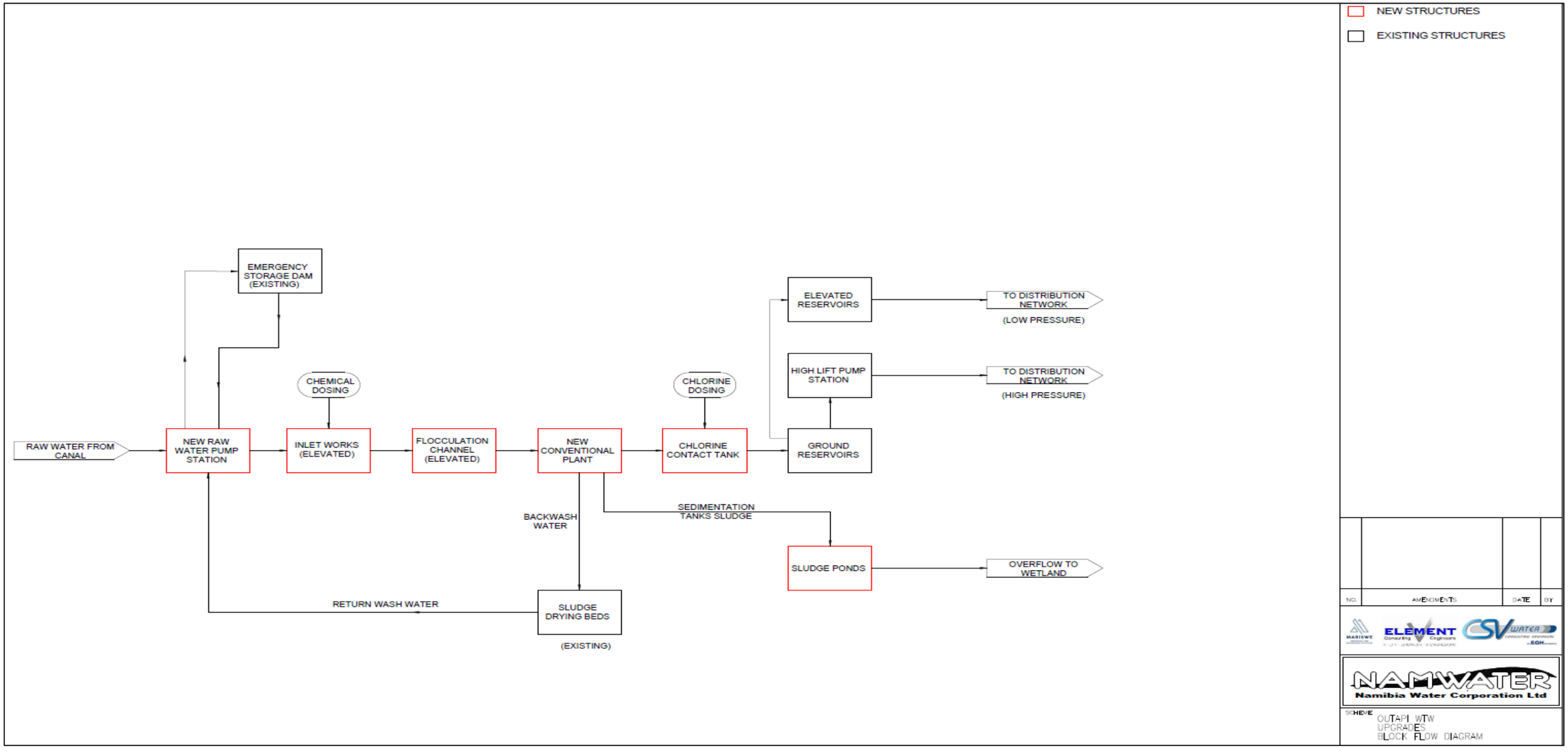

Figure 8: Schematic layout of the Proposed Outapi WTP

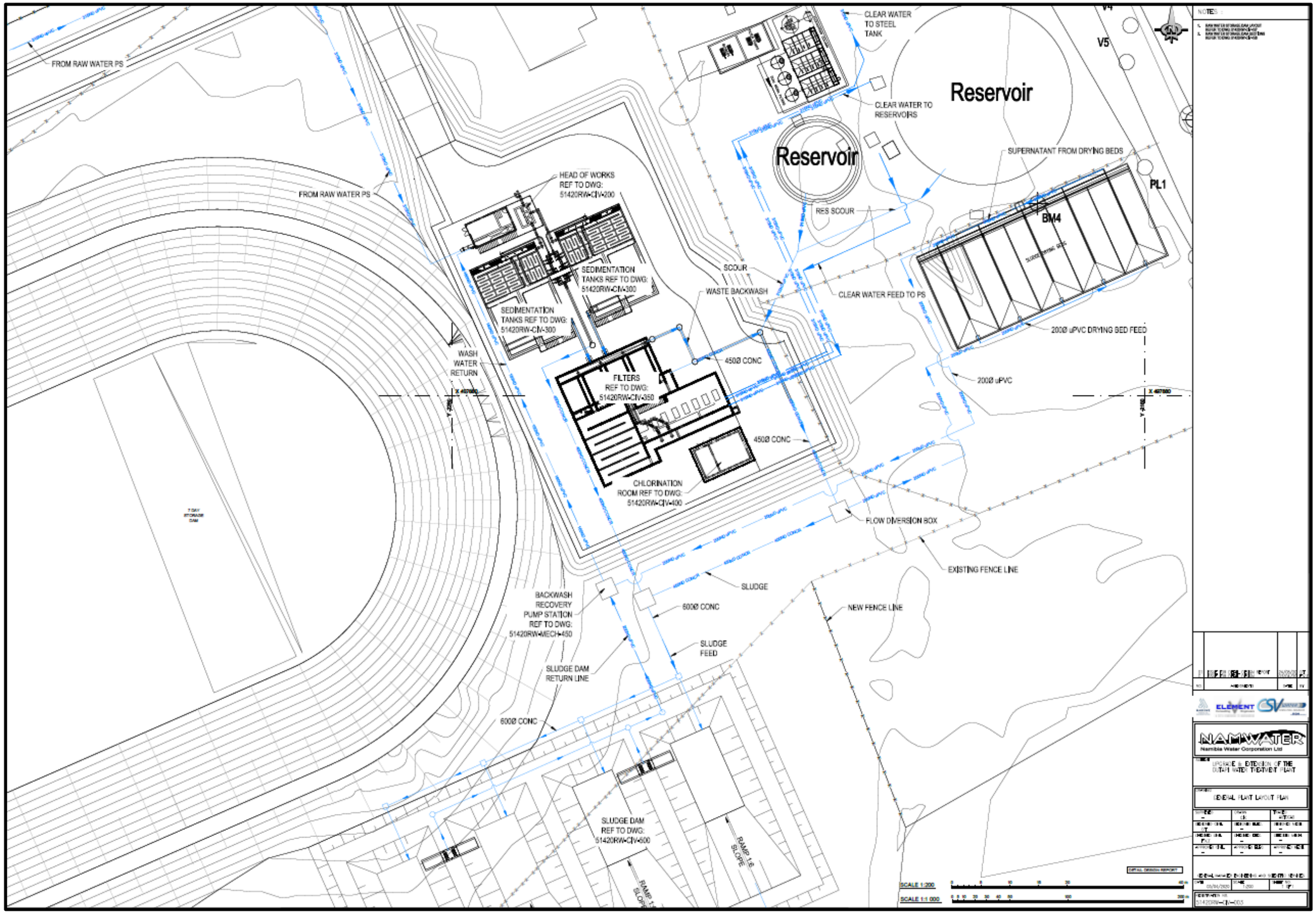

Figure 9: The proposed process flow (Source: Element Consulting Engineering)

6.2 The proposed works

The proposed works include the upgrading of capacities for certain plant components listed under 6.2.1 to 6.2.9 and construction of new infrastructures listed under 6.2.10 to complement the envisaged WTP as explained here below.

6.2.1 Abstraction works and raw water feed system.

The new raw water and emergency storage dam pumps will be installed in one combined pump station. The pump station will be equipped with two emergency storage pumps (one duty and one standby) with each pump delivering 311 m^3/h. The pump station would be located close to the canal and an access road above the flood level, will be provided between the WTP and the pump station.

Raw water will be extracted from the Calueque-Oshakati canal and will flow via two pipelines to the raw water and emergency storage sumps from where it will be pumped to the WTW and emergency storage dam, respectively. The water from the dam will gravitate back to the raw water pumps from where it is pumped to the inlet works.

The inlet works building will be a two-story structure with the inlet channel located on the first floor and chemical storage on the ground floor. The inlet channel is high enough to allow flow to gravitate through the rest of the works. Downstream of the channel, the flow is split to two flocculation channels, which are located on top of four sedimentation tanks.

6.2.2 Emergency raw water storage concept.

The existing earth storage dam will be refurbished to serve as an emergency storage dam for periods when the canal is taken out of operation for maintenance purposes. At peak demand, the required emergency storage capacity for a 14-day period, is approximately 80 000 m^3.
To provide the emergency storage facility, the following infrastructures are required:

- Provision of two new dry well emergency storage dam feed pumps located inside the new raw water pump station, complete with a raw water feed line from the canal to the pump station,
- A new rising main pipeline from the pump station to the dam and a new withdrawal pipeline between the dam and the pump station.
- Two manually operated sluice gates to allow the raw water and emergency storage sumps to be isolated if maintenance of the pipelines between the canal and the sumps.
- When the canal is out of operation, water from the emergency storage dam will be withdrawn to the raw water pumps by opening a manually operated sluice gate at the dam outlet box and opening and closing the relevant valves feeding the raw water pumps.
- Two raw water pumps (one duty and one standby) will be provided in the raw water pump station and will withdraw water from the sumps fed from the canal and pump it to the inlet works. When the emergency storage dam is in operation, the raw water pumps will be fed from the dam. These pumps will be fitted with variable speed drives (VSD), allowing the operator to vary the delivery of the pumps depending on the required flow rate.

- Two emergency storage pumps (one duty and one standby) will be provided in the raw water pump station and will withdraw water from the sumps and pump it to the emergency storage dam. These pumps will not be fitted with VSD, and the delivery of the pumps will therefore be fixed. Each pump set will be equipped with isolation valves and pressure gauges on the suction pipework and isolation valves, non-return valves and pressure gauges on the delivery side. Only the selected duty pump shall be in operation at a time. The duty pump will be alternated after each duty cycle by means of an automatic duty selector. Each pump will be provided with an emergency stop button located on a pedestal next to the pump. It will be possible for each pump sets to operate simultaneously. This will be necessary when the emergency storage dam is filled while the WTP is in operation and uses water from the canal.

6.2.3 Inlet works.

All the dosing systems will shut down automatically when there is no raw water feed into the works. The no-flow signal can either come from the raw water pumps or the raw water flow meter. It is proposed that this signal is received from the raw water pumps. If no inflow is received, it will not be possible to start any of the dosing systems. It is proposed that the chemical dosing rates be set manually by the operator considering the flow rate, pH, and turbidity of the incoming raw water.

On-line monitoring of the pH and turbidity will therefore be necessary. Downstream of the inlet works, the flow is split to the two flocculation channels. Each flocculation channel can be isolated by means of sluice gates. In addition, four hand stops will be provided (Two per flocculation channel). This will make it possible to split the flow in the ratio 33:66 for the case when one of the four sedimentation tanks are taken out of operation.

6.2.4 Hydraulic flocculation channels and sedimentation tanks

Two hydraulic flocculation channels will be provided. Each channel serves two sedimentation tanks. Any sedimentation tank can be isolated by opening or closing the sluice gates between the flocculation channels and the sedimentation tanks.

Except for isolation of a flocculation channel for maintenance purposes, no other control is necessary and has not been provided. Each sedimentation tank has been equipped with three actuated sludge withdrawal valves. It is proposed that the operator withdraws sludge by manually actuating the individual sludge withdrawal valves at a frequency to be determined during operations. It is desirable that the operator controls the actuated valves through the push of a button at the sedimentation tanks themselves and not remotely. This is to provide greater control of the sludge blanket. Sludge from the sedimentation units will gravitate directly to the sludge dams. The sludge pipeline design allows for a maximum of two sludge valves to be open simultaneously.

6.2.5 Filtration

Filtration is a polishing step that will remove the bulk of the settleable solids, colour, and turbidity that remains in the water after sedimentation. Four conventional rapid gravity filters have been provided. The filter media is supported on false floors fitted with nozzles at approximately 150 mm spacing c/c. Filtered water normally gravitates through the nozzles in the false floor into the plenum and from there to the chlorination contact channel. Backwash with air and water takes place in the reverse direction by feeding air and water into the plenum. By opening or closing a number of valves, the same pipework is used for filtration and backwash operations.

The filter media will be a single source media of silica sand with a bed depth of 800 mm which will sit on a support pebble media of 100 mm. The effective size of the media will be specified as 0.65 mm, with a uniformity co-efficient not exceeding 1.25. However, this will depend on the size of the media that is locally available.

6.2.6 Disinfection system

The disinfection system will cover the supply, installation, and commissioning of the following equipment.

- Two vacuum gas regulators suitable for two 1-ton cylinders
- One automatic changeover for the above
- Three chlorinators.
- Three Injectors
- Two weighing apparatuses, each suitable for 1 ton chlorine cylinders
- Four chlorination booster pumps (three duty, one standby); Only required if pressure from steel tank is inadequate.
- Two fans (one for chlorine store and one for chlorination room), and two louvres.
- Complete heating system to prevent freezing of the gas.
- Two full face gas masks with canisters
- One chlorine gas leak detector
- All interconnecting pipework
- Safety equipment and signs as specified.
- One wind direction indicator; and
- An electrical panel to control the above equipment.

The chlorinators shall be supplied complete with electrically driven pumping sets to furnish the necessary motive water, which shall be obtained from the end of the new chlorination contact channel. There shall be four pumps feeding motive water to the chlorinators. Three pumps shall be duty and the other standby. Three chlorination systems shall supply chlorine to the chlorination contact channel, the inlet works and an intermediate point still to be determined.

6.2.7 Clear water and elevated storage tanks

Two clear water pumps (one duty and one standby) will be provided in the machine room that also contains the filter backwash pumps and elevated steel tank pumps. The pumps will withdraw water from the clear well sump and pump it to the existing two reservoirs. These pumps will be fitted with VSD drives, which will allow the flow rate to be set slightly higher than that of the raw water pumps. This will allow the pumps to run almost continuously, minimizing the number of stops and starts of the pumps between cycles. Each pump set will be equipped with isolation valves and pressure gauges on the suction pipework and isolation valves, non-return valves and pressure gauges on the delivery side. Only the selected duty pump shall be in operation at a time. The duty pump will be alternated after each duty cycle by means of an automatic duty selector. Each pump will be provided with an emergency stop button located on a pedestal next to the pump.

Two elevated steel tank pumps (one duty and one standby) will be provided in the machine room that also contains the filter backwash pumps and clear water pumps. The pumps will withdraw water directly from the reservoirs and pump it to the existing elevated steel tank. These pumps will not be fitted with VSD drives and will deliver a constant flow rate. Each pump set will be equipped with isolation valves and pressure gauges on the suction pipework and isolation valves, non-return valves and pressure gauges on the delivery side. Only the selected duty pump shall be in operation at a time. The duty pump will be alternated after each duty cycle by means of an automatic duty selector. Each pump will be provided with an emergency stop button located on a pedestal next to the pump.

6.2.8 Sludge and backwash recovery system

Currently effluent streams from the sedimentation tanks are routed to five concrete sludge beds. Additionally, four sludge dams will be constructed to increase the capacity of the sludge facilities. Sludge will be generated from the backwash cycles on the filters as well as during desludging of the sedimentation tanks. It is proposed that the two waste streams be split with the sedimentation tank sludge being taken to four new sludge dams, while the filter backwash water is routed to the existing sludge drying dams. The supernatant from the sludge drying beds will be pumped back to the inlet works. A bypass facility will be provided so that the backwash water can also be taken to the sludge dams.

Sludge from the sedimentation tanks and backwash water from the filters will gravitate to the sludge dams. The sludge dams will be used on a rotational basis, for approximately three months until it is full of sludge. A period of nine months is then available for the sludge to dry out and be removed. Supernatant is decanted from the sludge dams daily by drawing it off from different depths. The supernatant gravitates to a wash-water recovery pump station from where it is pumped back to the inlet works. The volume of supernatant is low, and a small submersible pump station is proposed. As the filter, backwash water contains very few solids, an option has been provided where this water can be diverted to the existing sludge drying beds before it is decanted directly to the wash-water recovery pump station. As an alternative, sludge removed from the sludge dams, could be placed on the sludge drying beds for further drying.

6.2.9 Pipe works.

The pipe works will include the upgrading of pipelines and clear water pumps to the elevated water tower, which feeds Outapi Town as well as the feed pipeline between the reservoirs and the four Grundfos clear water pumps feeding the ONRWSS.

6.2.10 Construction of new components

The following new plant components will be constructed to form part of the new water treatment plant.

- New 355 mm diameter uPVC raw water pipeline from the canal to the plant
- New raw water pump station.
- Inlet works.
- Sedimentation tanks.
- Filter building with new filters.
- Chemical storage and Chlorine dosing facilities.
- Chlorine contact tank and clear water sump.
- A new machine room which will form part of the filter building and will contain two backwash pumps, two blowers, two new clear water pumps and four chlorine booster pumps.
- Four sludge dams (Sludge disposal and water recovery).

6.3 Plant Capacity

The initial design plant capacity is 235.9 m^3 /hr. with the average flow rate of 283 m^3 /hr. The proposed plant will be operational for 20 hours per day allowing for 4 hrs., maintenance period. The expected losses of about 10% of which about 6% can be recovered through backwash recovery system. Provision has been made to increase the raw water feed by 10% which increases the flow rate to 311 m^3/hr. in case the recovery system is not functional.

6.4 Associated infrastructures.

- a). Upgrading of the office building

Substantial extensions and upgrading of the existing office building have been proposed. The elevated steel tank will be removed, and the space will be utilized for construction of new office building. In addition, the clear water pumps attached to the existing office building will be moved to the new pump station. The existing chlorine and chemical dosing equipment will also be relocated to the new chlorine dosing and chemical dosing buildings respectively to freeing up more space. Details of the proposed extensions to the office building are not yet finalized but a low-cost building is envisaged. The proposed floor plan for the existing office building and the proposed extensions are depicted in Figure 9, below.

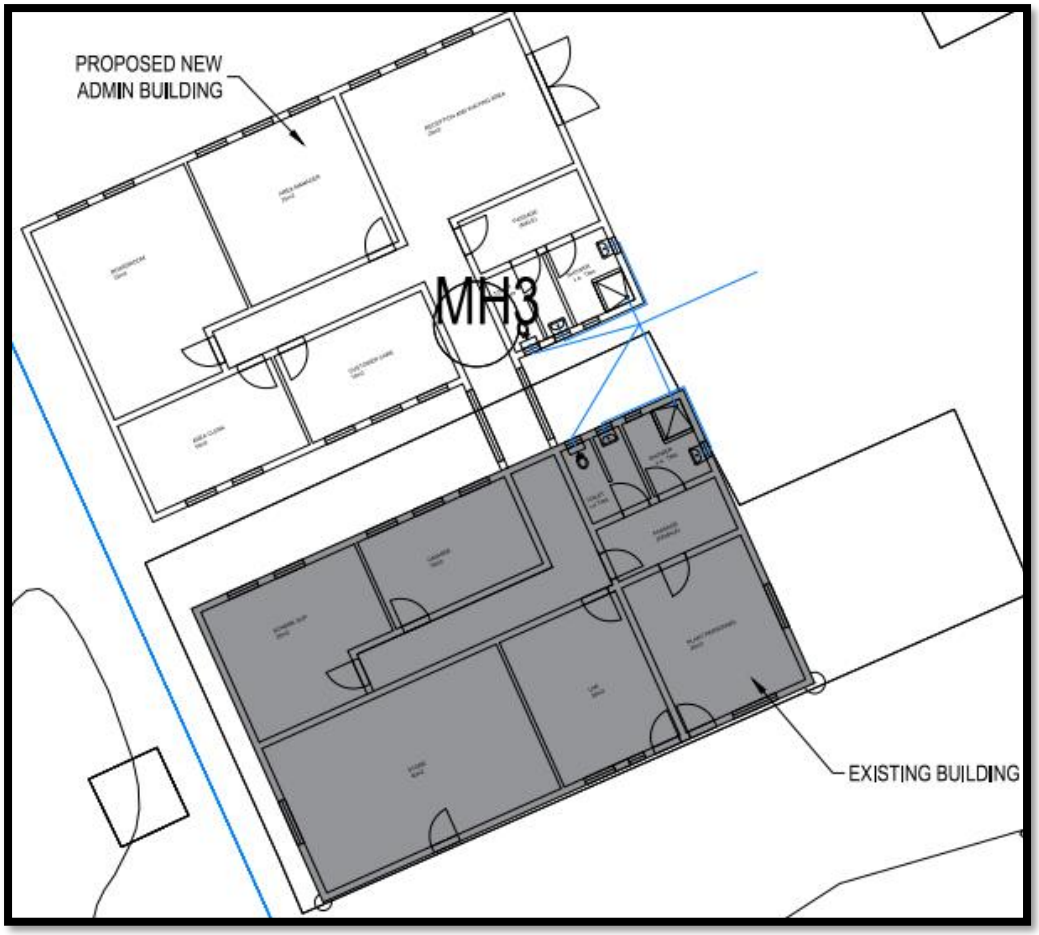

Figure 10: Proposed administration building (Source: Element Consulting Engineers, 2020)

6.5 Resource requirements

6.5.1 Project costs

The total project cost for the proposed new Outapi WTP is estimated at about N$ 60 million and will be distributed as follow.

- Civil works: N$ 40 273 750.00
- Mechanical and electrical works. N$ 15 592 500.00
- Miscellaneous costs: N$ 2 793 312.00
- Professional fees N$ 1 340 437.50

6.5.2 Land/space requirements

According to the preliminary design, all proposed construction works will take place within the jurisdiction of the existing Outapi WTP area. Most of the infrastructures are to be housed within the existing perimeter fence, expect for the pump station which is to be shifted outside the plant fenced area next to the canal.

6.5.3 Electricity consumption and requirements

Currently, the Outapi WTP is connected to a power grid served with a 200 kVA transformer. The proposed plant requires a power grind with an estimated capacity of 800 kVA. Electricity is required for different plant operational activities such as.

- Raw water:
- Emergency storage:
- Chemical dosing
- Filters:
- Office use and lighting

6.5.1 Workforce requirements

The current Outapi WTP personnel consist of 10 staff members which include, 4 plant operators, 1 water artisan, 1 meter reader, 2 water works officers, 1 cashier and 1 supervisor for Cuvelai water distribution scheme.

The proposed new treatment plant is designed to be always manned and shall not be possible to be operated without the presence of an operator/s. Hence, one additional operator is required to complement the current operators. The expansion of the office building and additional infrastructures will require an additional supporting staff such as, artisans, cleaner etc. to ensure the smooth operation of the treatment plant.

7. Project alternatives

In terms of Section 3.5 [1] (g) of the EIA Regulations, the baseline assessment should include an investigation of feasible alternative options to any proposed development. Alternatives to the project refers to the different means of meeting the general purpose and requirements of the project. Alternatives considered under this Scoping study are such as.

- No action (the option of not implementing the project)
- Site alternatives (the property on which or location where it is proposed to undertake the project)
- The design or layout of the project
- The operational aspects of the project

These alternatives have been discussed from the environmental and socio-economic perspectives, here below.

7.1 Null or No-action alternative.

The Null or No-action alternative in respect to the proposed project would imply that the status quo will be maintained and that the proposed works shall not be implemented in any form.

This option is most suitable alternative from an extreme natural environmental perspective as it ensures non-interference with the existing environmental settings. This option also mean that the associated negative and positive impacts as outlined in this Scoping report will not be encountered or realized.

Given the fact that the capacity of the existing treatment plant is not sufficient to meet the current water demand, an additional water treatment capacity is required to respond to the current and future water demand of safe drinking water for the Outapi town and surrounding communities. The No-go action would not be an ideal alternative. Hence, adopting the no action alternative will mean that the existing shortfall in water supply will continue to prevail unabated and the future water security in the Ombalantu area will be seriously compromised.

7.2 Site alternatives

The proposed works entails the upgrading of certain existing plant components and construction of additional infrastructures for the new conventional Outapi WTP. All proposed works are to be constructed within the existing Outapi WTP area and no additional development site or encroachment beyond the boundaries is necessary, thereby limiting the development footprint. As such, no off-site or other site-specific alternatives have been investigated.

7.3 Design alternatives

According to the Design Engineer, various water treatment options were examined, including whether the capacity of the existing package plant should be increased by the addition of another package plant or a conventional (concrete) plant. Eventually, the proponent (NamWater) decided to decommission the package plant and construct a new conventional WTP with a capacity of 283 m^3 / h. Such plant should be able to produce potable water conforming to the draft national water quality standards and effluent treatment complying with the draft national effluent disposal standards.

During the initial design phase, it was established that the proposed emergency storage dam with the required capacity would take up almost the whole site and that there would be very little space left for any future expansion of the WTW. A conclusion was reached that that the emergency dam should be designed for 7 days' storage (40 000 m^3) and that another site would be identified to provide the outstanding 7 days' storage.

7.4 Operational alternatives

The operational alternatives considered for the proposed water treatment plant include the sludge ponds lining options and sludge management and usage options.

7.4.1 Sludge ponds lining options.

The sludge ponds need to be lined to prevent water seepage and leakage from the ponds. This will ensure water conservation, avoid groundwater contamination, and promote good public health through the control of reeds which harbor diseases carrying pathogens such as mosquitoes, mice, and snakes. Some of the commonly used pond liner materials include poly-vinyl chloride (PVC), EPDM rubber, high-density polyethylene (HDPE) and polypropylene (PP).

Table 9: Sludge lining options

Lining material	Advantages	Environmental concern
poly-vinyl chloride (PVC)	excellent abrasion resistance and is difficult to puncture, highly flexible and cheaper	resistant to most common chemicals but easily damaged by the sun
ethylene propylene diene monomer rubber (EPDM)	easy to seam and easy to patch, most common	algaecide and fire retardant-free and resistant to the sun
high-density polyethylene (HDPE)	resistance and seam strength.	highly chemically resistant.
Polypropylene (PP)	Durable	Sun resistance and is highly chemically resistant.

The PVC liners is more recommended as it the most common, cheap, and offers a wide range environmental advantages compare to other lining materials. Alternatively, the HDPE liners can also be considered because it is very stable and offer outstanding tear resistance and seam strength. The EPDM rubber and PP are least recommended, since they are less common and can also be more expensive than PVC and HDPE liners.

7.4.2 Sludge management options

Sludge will be generated from the backwash cycles on the filters as well as during desludging of the sedimentation tanks. The sedimentation tank sludge contains almost all the solids generated by the WTP, while the backwash water contains mostly water.

In the proposed WTP, sludge from the sedimentation tanks and backwash water from the filters will gravitate to the sludge dams. The waste streams will be split with the sedimentation tank and sludge will be routed to four new sludge dams, while the filter backwash water will be routed to the existing five sludge drying dams. These dams will be used on a rotational basis, for approximately three months until it is full of sludge. A period of nine months is then available for the sludge to dry out and be removed.

a). Current practices

Currently the streams from backwash and sedimentation process are routed to five concrete sludge beds that are completely undersized. The beds have both underdrains and supernatant draw-offs. The supernatant is recovered and pumped back to the inlet works. Sludge is removed every three months and left in a heap to dry (as depicted in the Figure 11 below). Dry sludge is often collected and disposed of as waste at the Outapi dumping site. In some instances, dry sludge is buried on site or collected by local farmers as composts.

Figure 11: Current desludging process

b). Recommended sludge management options.

According to Ewelina, (2016), the sedimentation and coagulation processes in conventional WTP produce a huge amount of sludge. The amount and quality of sludge is variable and depends on the quantity of water treated, the quality of its content, color intensity, doses of coagulants and many others. Below is a typical example of water treatment process and available Water Treatment Sludge (WTS) management options.

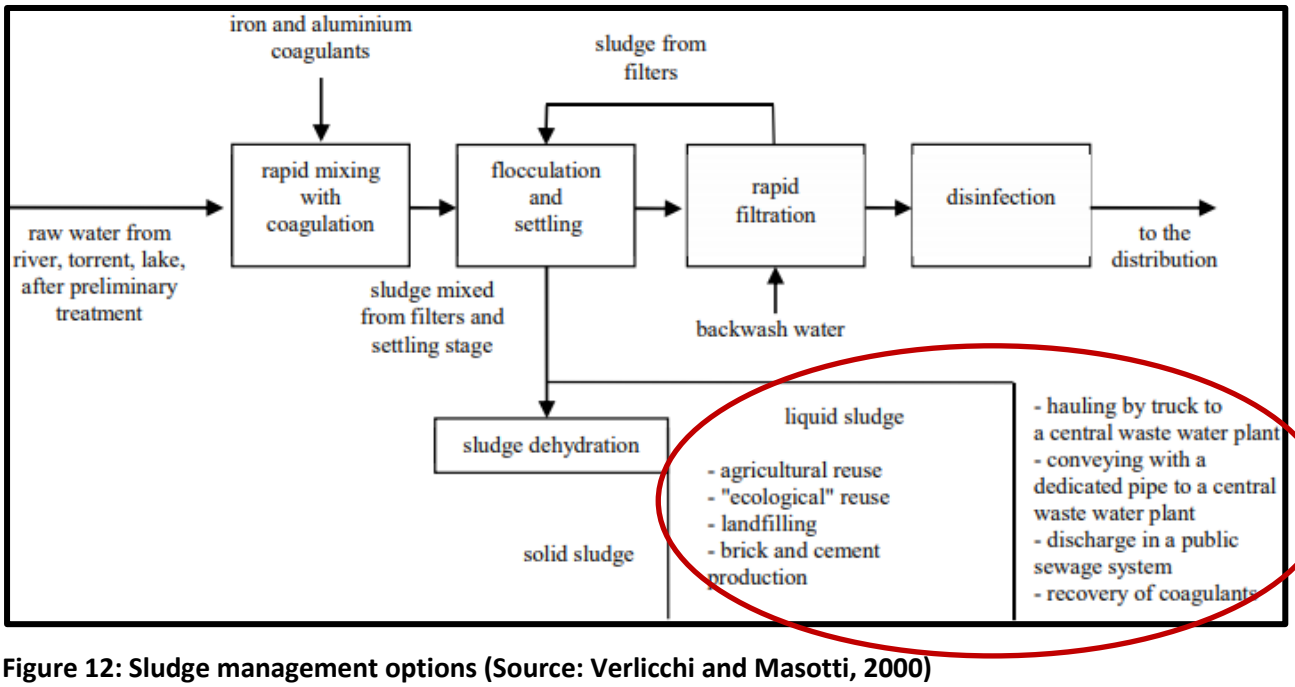

Figure 12: Sludge management options (Source: Verlicchi and Masotti, 2000)

As depicted in Figure 12 above, there are many available management options for post-coagulation sludge such as agriculture, ecological re-use, landfilling and/or as a secondary raw material in civil engineering, e.g., for production of bricks, tiles, ceramic tiles, pipes etc.

The management of WTS is of environmental concern and requires careful consideration. The recovery, recycling and reuse is an optimal solution for WTS management. The chemical composition of the WTS depends on the coagulant composition, raw water quality and the dose of used coagulant.

According to NamWater: Department of Applied Scientific Services, the concentration of metal elements in the coagulation sludge from the Outapi WTP are below the detectable level. As such, the sludge from this WTP cannot be regarded as a toxic substance.

Therefore, the recommended sludge management option for Outapi WTP is safe disposal of dry sludge at the Outapi waste disposal site. However, it is not recommended for sludge to be buried onsite, as it occasionally occurs at the current WTP.

8. DESCRIPTION OF THE RECEIVING ENVIRONMENT

Below is the environmental baseline of the receiving environment. It entails a description of various environmental receptors that are likely to be affected by the proposed project. This includes both the socio- economic and biophysical aspects.

The impacts on socio- economic aspects will affect a greater geographical area e.g., constituency, regional and national. Hence, the description of the socio-cultural-economic baseline provided for the study area corresponds to the extent of the community in which the project is taking place.

On the other hand, the baseline study area chosen for physical and ecological data collection is mainly the area that is in the direct zone of influence of the proposed treatment plant, its process facilities and supporting infrastructures.

8.1 Socio-economic environment

8.1.1 Regional setting

Omusati region is one of the fourteen regions of Namibia. It is located on the north-central part of the country, and it shares borders with neighboring Angola. It also borders with Ohangwena and Oshana regions in the east and Kunene region in the west. It is made up of 12 political constituencies namely, Ruacana, Onesi, Outapi, Okahao, Otamanzi, Tsandi, Okalongo, Anamulenge, Ogongo, Elim, Oshikuku and Etayi (NSA, 2014).

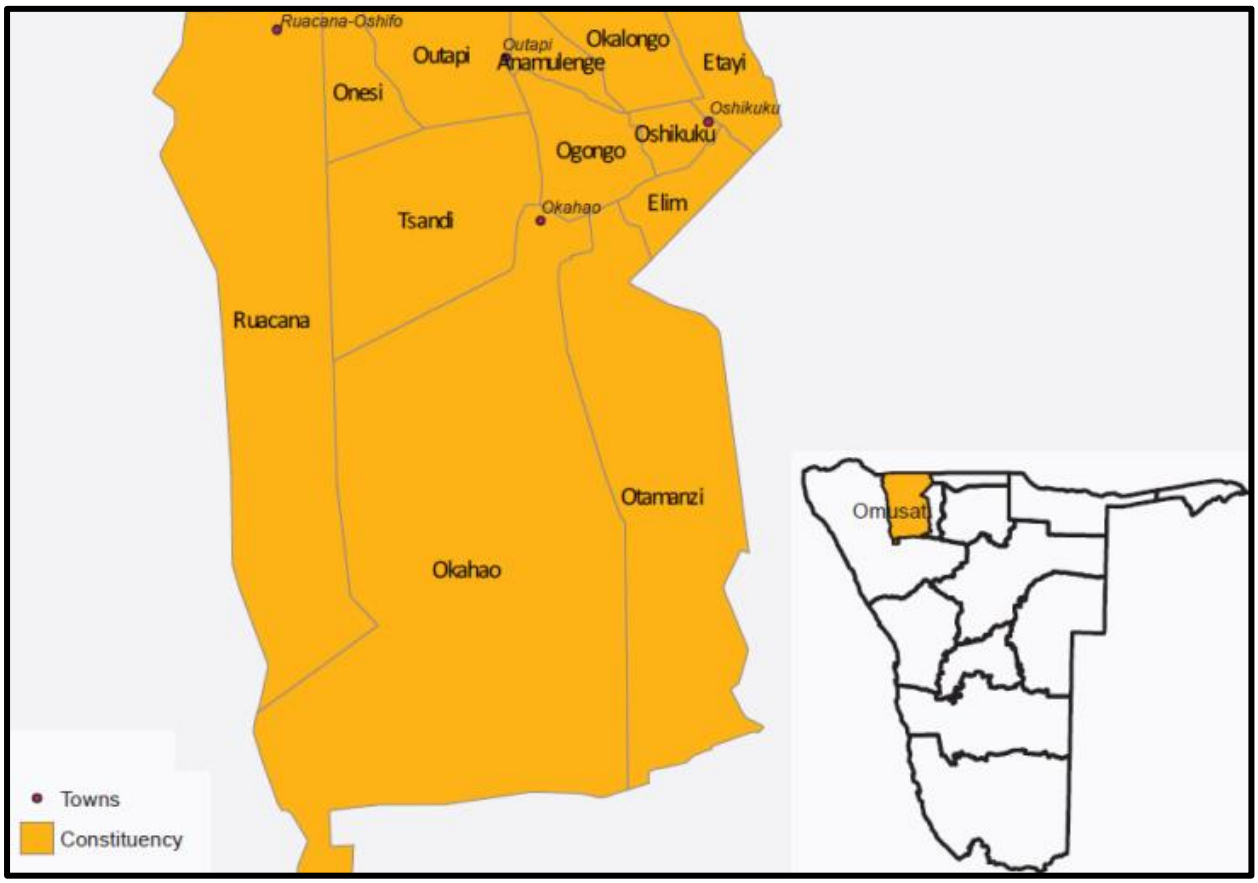

Figure 13: Omusati region (Source: NSA, 2014)

Outapi is the administrative capital of Omusati Region and the district capital of the Outapi Constituency. The town of Outapi was declared in 1997 and became autonomous in 2002. The town is surrounded by six urban settlements and towns such as Ogongo settlement on the southeast, Okahao town to the south, Tsandi town to the southwest, Onesi settlement to the west, Ruacana town to the northwest and Okalongo settlement to the north-east.

8.1.2 Population and demographics

The total population of Omusati region was estimated at around 243,166 people in 2011 of which about 13,848 or 5.7% lived in urban areas. The region is one of densely populated with the density of 6.7 to 11.2 people per square kilometer.

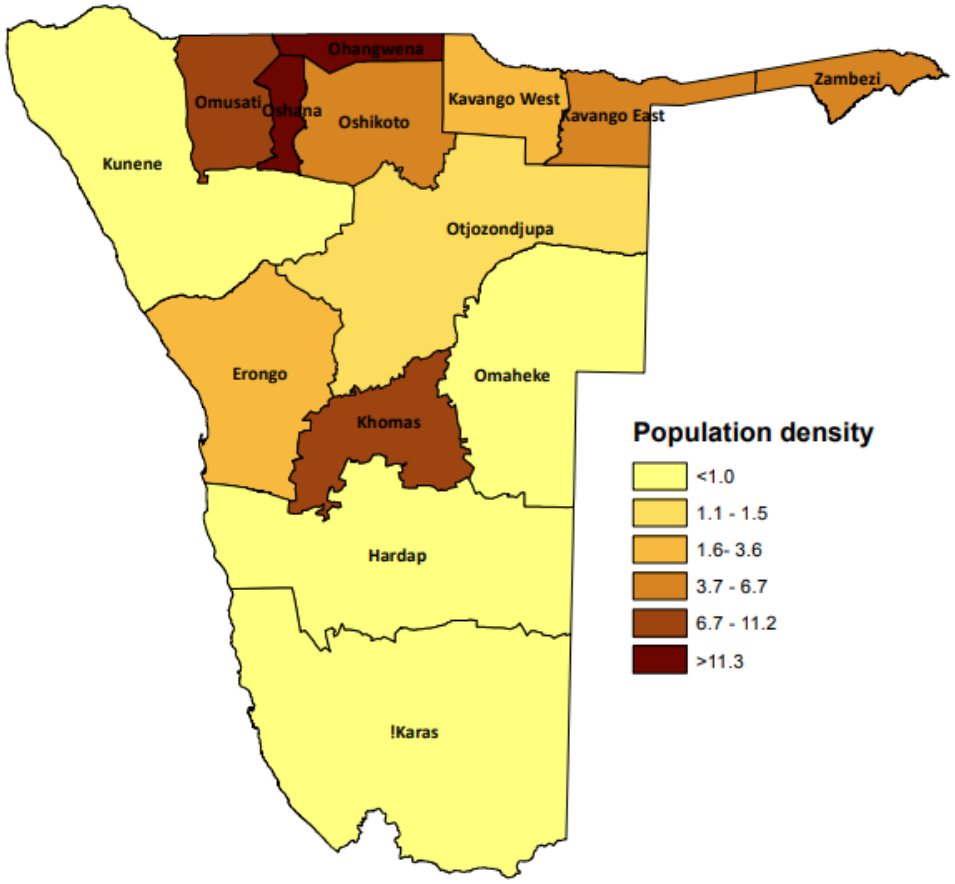

Figure 14: Population density by area (Source; NSA, 2011)

Urbanization through urban development in the overall Omusati region showed a growth rate of nearly 20% in comparison to 0.1% for rural developments. Being the largest urban center in the region, the town of Outapi is the most populated town in Omusati Region with approximately 15% of the total regional population (NSA, 2011).

Table 10: Population distribution of the supply area (Source, NSA, 2011)

Area	Supply scheme	Estimated Population Size in 2011
Outapi Constituency (including Outapi town)	OMO	36,934
Tsandi	ODK	28,018
Anamulenge constituency	OTL	13,410
Okahao	OHP	17,548
Total		**95,910**

8.1.3 Employment and livelihoods

Unemployment in Omusati region was estimated at 35.6% in 2011. Omusati region is predominantly an agricultural region with land based agricultural activities which include mainly crop and livestock farming is highly favored. The main crops grown in the region are mainly millet (mahangu) and sorghum as well as vegetables i.e., tomatoes, onions, etc. Many households in the area own livestock i.e., cattle, donkey, sheep, and goat that are kept outside the zone and supplemented with poultry (First Capital Ltd., 2018).
Agriculture is the main economic activities and contribute about 46% of the household income. Other sources include wage labour, pensioners, informal sector (entrepreneurial activities and businesses), natural resource exploitation, tourism, and employment within the hospitality industry (NSA, 2011).

The main sources of household food are from own production, purchases from the market, and exploitation of natural resources. Due to the high population density livelihoods have been diversified particularly with non-farm income sources, such as trading, crafts, and labour First Capital Ltd., 2018).

8.1.4 Economic and social development

Omusati region is served by a total of five hospitals, situated at Outapi, Okahao, Oshikuku, Tsandi and Okalongo. There are a further 6 health centers, 33 clinics and 76 outreach centers. The Outapi town is served with one district hospital, and a clinic. The district hospital is meant to serve a population of those living in Outapi including the population living in nearby villages. There are also six private health consultation facilities operating in Outapi which do not offer bedding to admit patients and one private hospital offering bedding operating 24 hours a day.

In terms of education, there are 265 schools in Omusati region, comprising of 161 primary schools, 86 combined schools and 18 secondary schools. About 20 of these schools of which 3 are government boarding secondary schools are within the Ombalantu area. There are also two private schools that offer primary education and two vocational training centers.

The town of Outapi as the commercial and administrative hub for the Omusati region is the base for most of the public facilities. There are several government and parastatal's' regional offices that are meant to provide most of the services provided by the respective head offices in Windhoek. The most common forms of communication in the region are radios and mobile communications.

8.1.5 Sanitation

In 2011, about 78% of the population had no access flush toilet, while only 52% had access to potable water (NSA, 2011).

8.2 Biophysical environment

8.2.1 Climate

The climatic condition of the northern central of Namibia is described as semi-arid to sub-humid with the rainfall confined mainly in summer months (November-March).

- Precipitation

The area receives a significantly greater amount of precipitation, averaging ranges from 350-400 mm per year. The rainfall pattern is highly variable in amount and distribution. The wet and dry spells are thus a normal climatic feature of this environment. The average rainfall of over two-thirds of the year`s rain falls is mostly concentrated in January, February, and March.

- Temperature, humidity, and evaporation rate

The average annual temperature of the area is ranges from 17°C during winter (June - July) to about 35°C in summer (November – December). The mean average humidity ranges from 20% in September, up to 80% in March. As depicted in Figure 12 below, the average evaporation rates of the area, range from 1,960 mm to 2,100 mm annually (Mendelson, 2000).

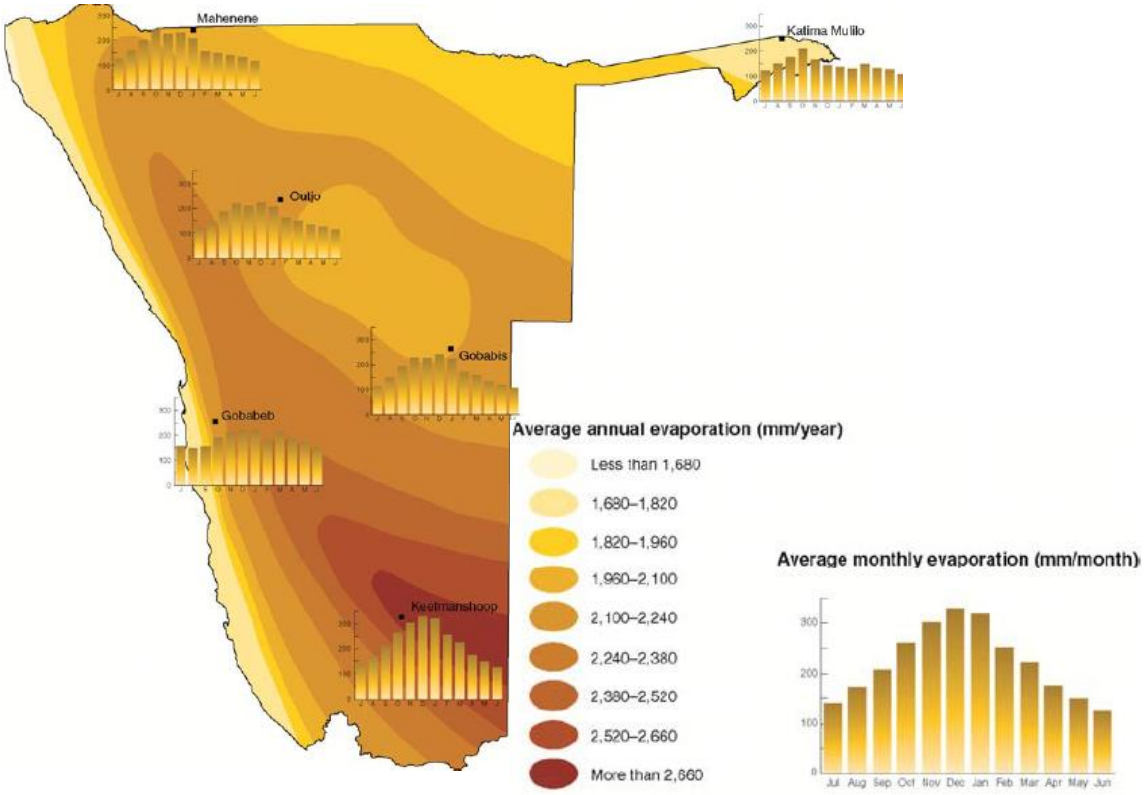

Figure 15: Average Evaporation rate (Mendelson, 2000)

8.2.2 Topography

The topography of the Outapi area is characterized by an extremely flat area with altitude level between 1000-1500 m. The elevation of the development site is slightly undulating with a surface elevation ranging between 1113 and 1109 m.a.s.l.

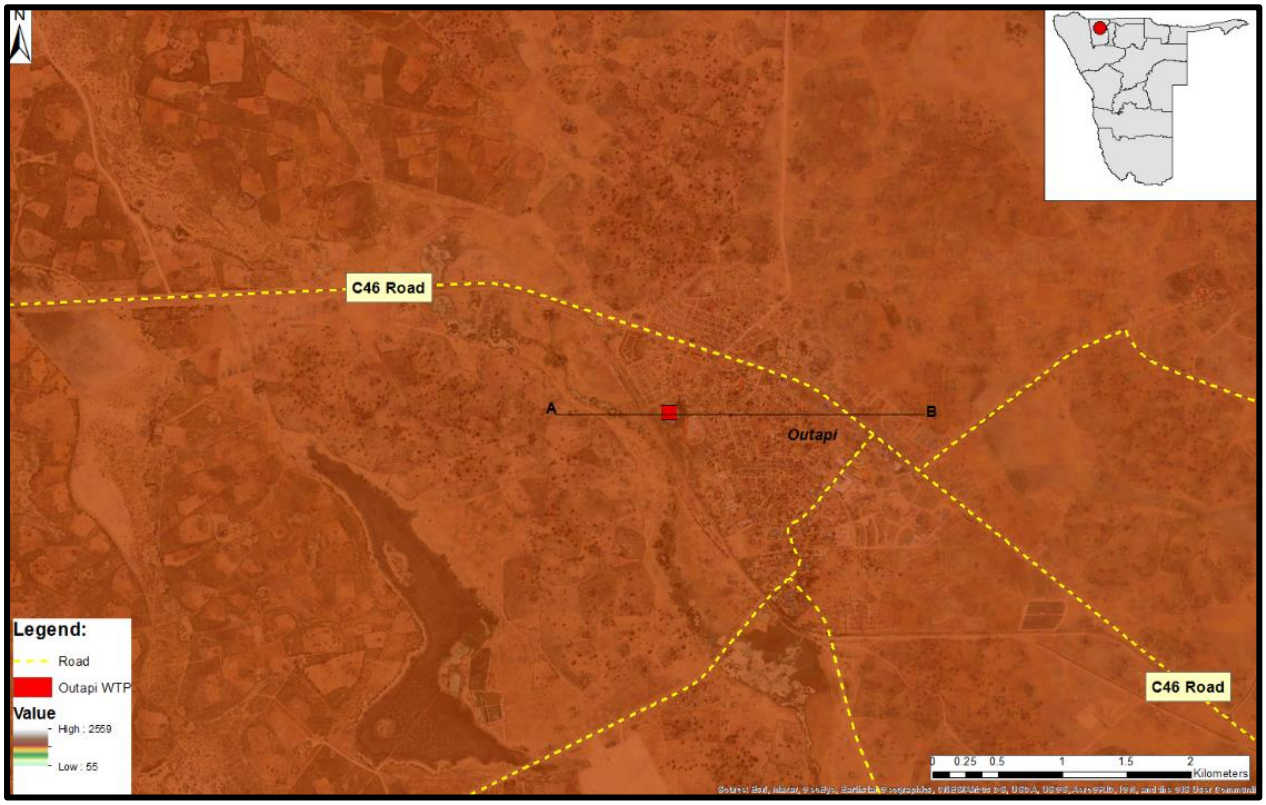

Figure 16: Topography of the area and development site

8.2.3 Hydrology

In general, the north central of Namibia is intersected by a network of shallow watercourses locally known as Oshanas, which comprises of the Cuvelai Delta. These Oshanas are usually recharged by floodwaters that flow from the highlands of the neighbouring Angola. The Oshanas also receive and keep water from heavy rainfalls that are occasionally experienced in this part of the country (Mendelsohn *et al,* 2009).

According to the Flood Risk Assessment of Outapi town by Tamayo V, *et al*, (2011), Outapi town is heavily affected by seasonal floods during the rainy season. Floods occur as consequences of heavy rainfall that inundate low lying areas within town boundaries.

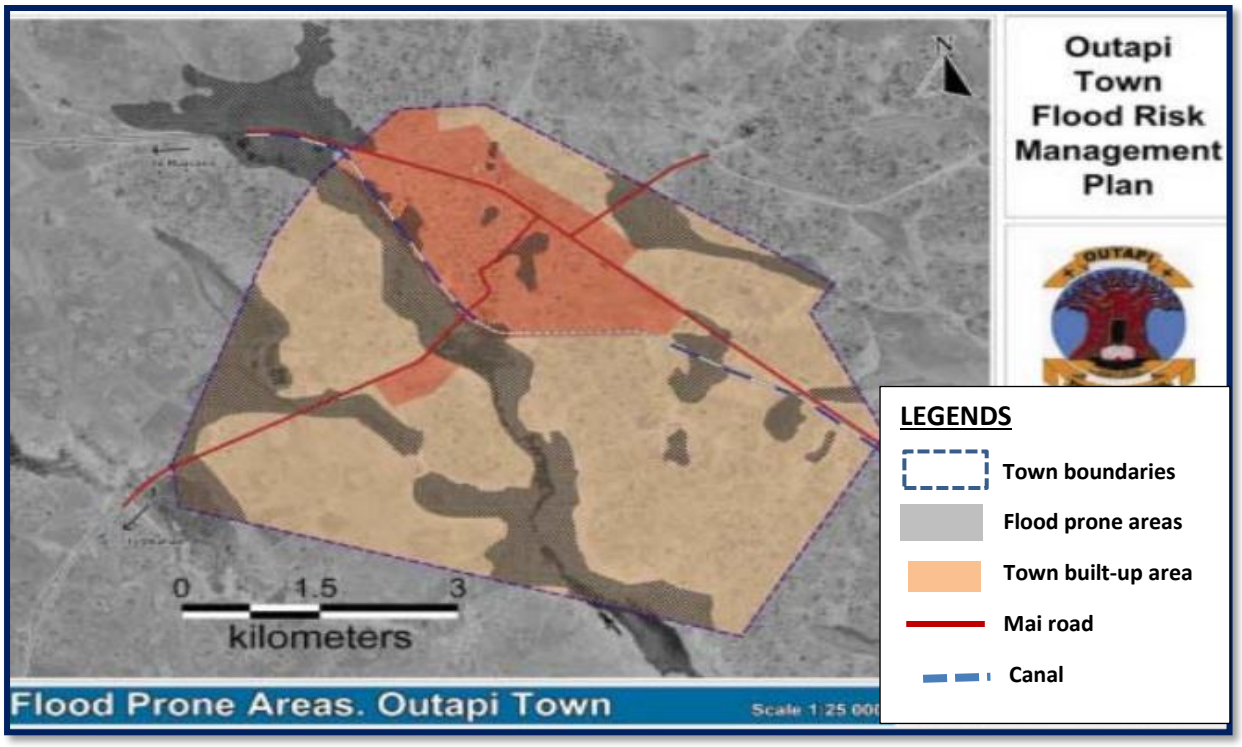

Figure 17: Flood risk assessment (MURD)

As depicted in the map above, the development site is also surrounded by the flood prone areas, thus at grave risks of flooding. Flood may also occur as the overflows from Calueque-Oshakati canal located on its south-westerly side. Hence, proper drainage system must be installed around the site to ensure flood water is bypassed back into the nearby oshanas.

8.2.4 Soils

The soil of Outapi is dominated by deep Kalahari and Namib sand that mostly occur in the formation of sands and other sedimentary materials, while the clay sodic sands dominate in the oshanas. The most dominant soil is the Eutric Cambisols that is characteristic by its consistency, colour, and structure. It is mostly found in the water depression and low-lying areas, and typically contain accumulations of calcium carbonate. The geotechnical investigation of the site discovered that the soil of the development site is characterised by a loose to medium dense slightly clayey sandy material with a limited pinhole voided fabric. The permeability of the alluvium soil underlying the development site is classified as pervious to very pervious (Mendelsohn *et al,* 2009).

8.2.5 Geology

The northern central regions are underlain by tertiary to quaternary aged sediments, belonging to the Kalahari supergroup (Miller, 2008). The local geology comprises of clayey silts, sands and occasional gravel underlain by moderate to well cemented silcrete and calcrete. The Kalahari Group in the northern central Namibia varies in depth between 225 m to 500 m in vertical thickness and covers extensively the north central until the north-eastern Namibia.

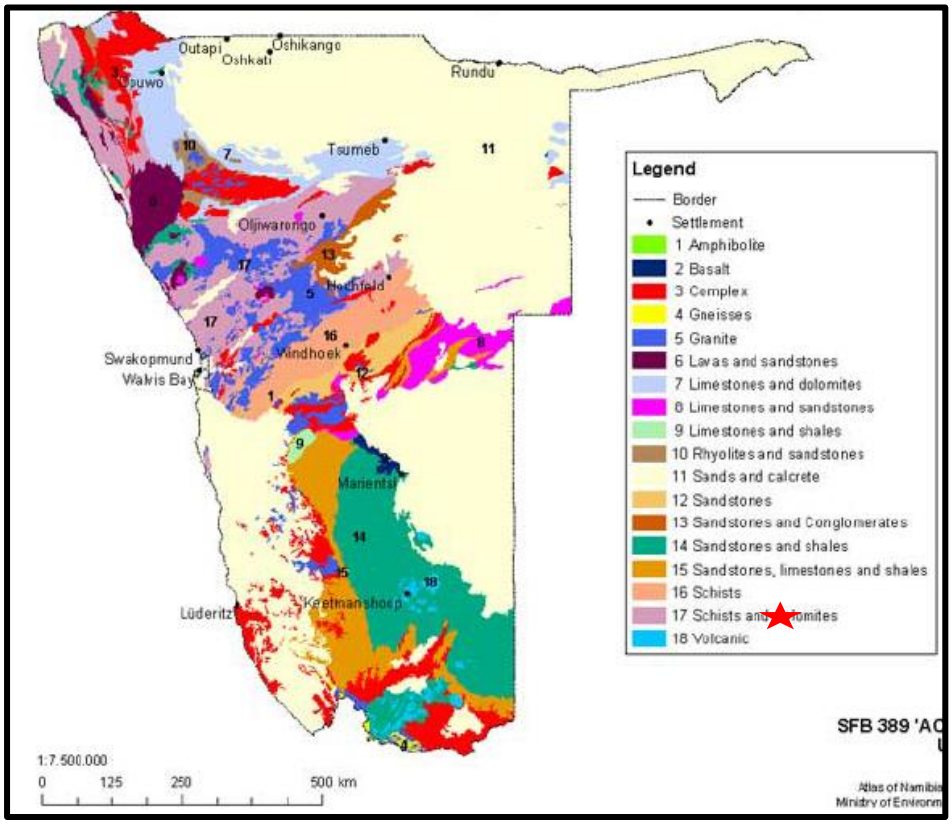

Figure 18: Rocky types of Namibia (Source Mendelsohn et al, 2009)

8.2.6 Local occurring flora and fauna

Since the larger part of the development site is a built-up area, it is not considered ecologically sensitive. The built-up area is complemented with ornamental plants species, mostly exotic shade trees and hedges which are used for shade and aesthetic pleasing. Some parts of the site are denudated while the low-lying areas are characterized by grass species, mainly the "*Kweek"* grass and *Eragrostis echionchlodea,* dotted with several thorn trees and shrubs which are sparsely distributed across the site. In addition, the sludge ponds are covered with thick and overgrown reed beds.

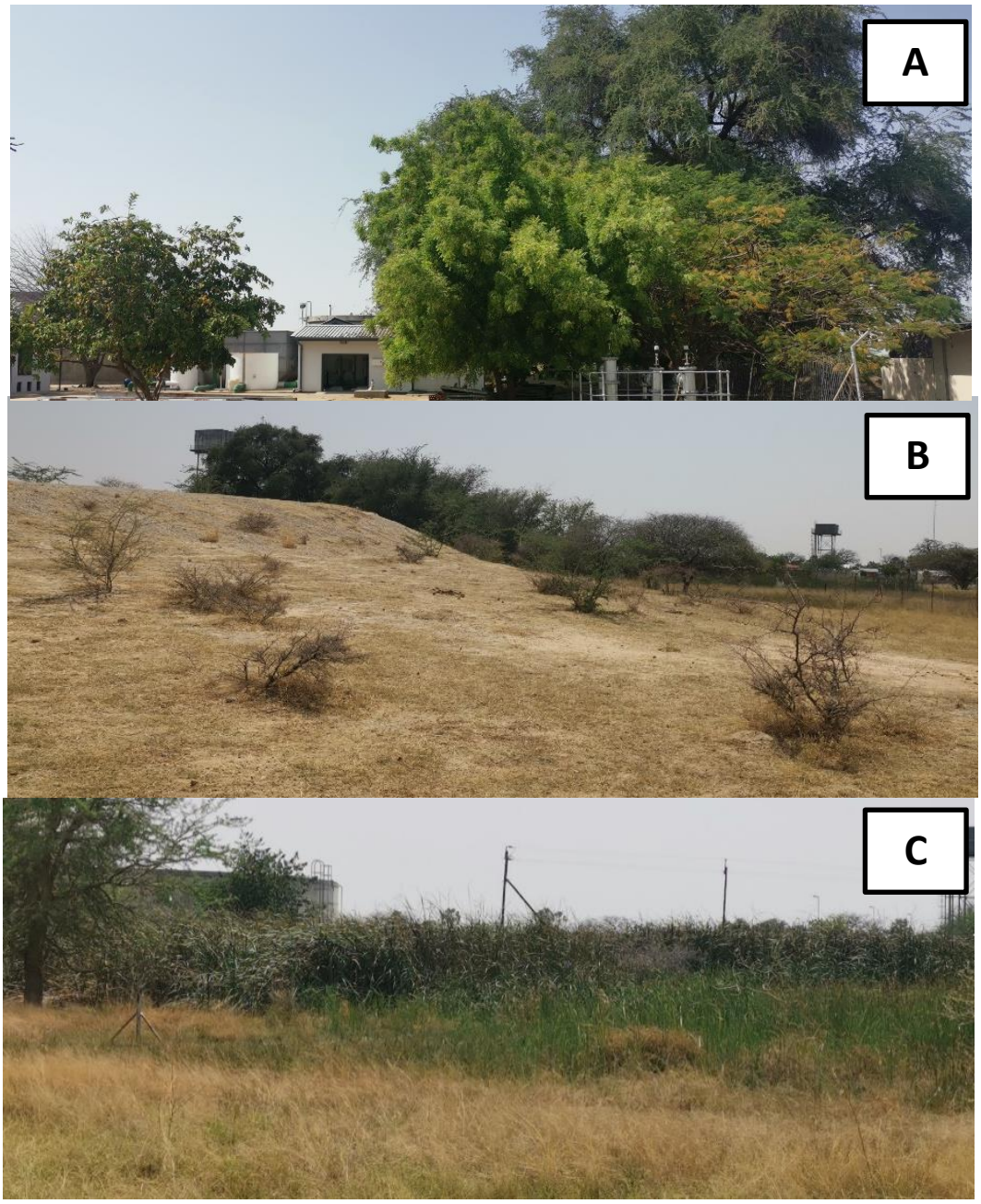

Figure 19: Vegetation of the site (Source: Green Gain Consultants cc, 2020)

A – Ornamental shade trees
B – Thorn bushes and grass around the site
C – Reed beds in the sludge ponds and low-lying areas

The local occurring fauna expected to occur at the site and surrounding are mainly, reptiles, and small ground burrowing animals such as *snakes, lizards, and different types of rodents* as well as common bird species i.e., *plocecus & sociable weavers*, *reed bunting, bishops* etc. In addition, domestic animals such *cattle, donkey, sheep, and goats* from the nearby village were also observed wondering in the site vicinity, in search for grazing and water.

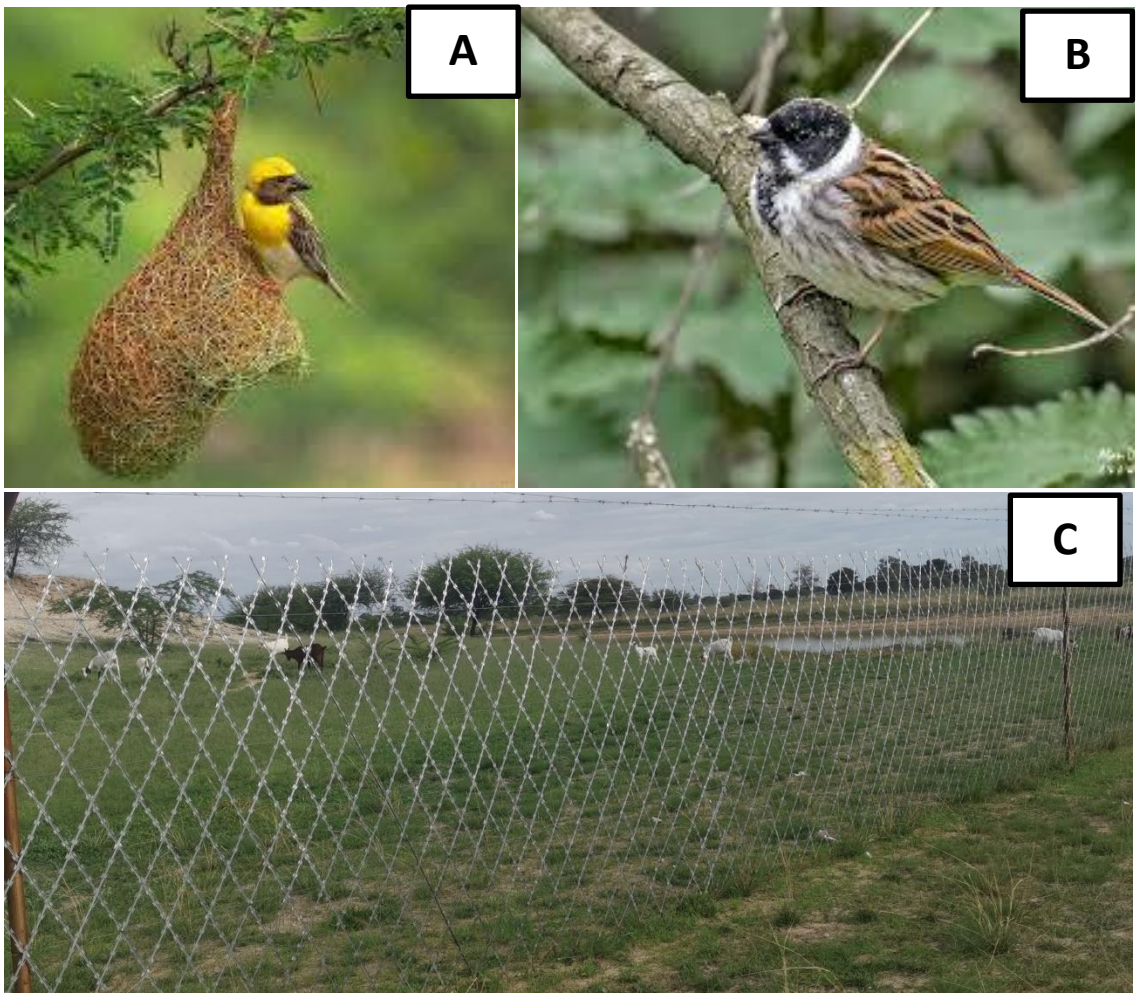

Figure 20: Local occurring fauna.

A – *plocecus weaver*
B – *reed bunting*
C – domestic animals (goats) inside the plant area

9. ANTICIPATED ENVIRONMENTAL IMPACTS

This section provides anticipated environmental impacts (short-term and long-term) associated with the planning & design, construction, operation and decommissioning of the proposed Outapi WTP. According to the EIA Regulations, the term "environment" is referred to the complex of natural and anthropogenic factors and elements which include both the natural environment and the human environment. Hence, the assessment considered the potential impacts on both socio-economic and biophysical settings of the receiving or affected environment.

9.1 Impacts rating scales.

In assessing the impact of the proposed development, four rating scales were considered. Each issue identified was evaluated in terms of the most important parameter applicable to environmental management. These include the ***extent, intensity, probability, and significance*** of the possible impact on the environment and whether such effects are positive (beneficial) or negative (detrimental). The rating scales used are as follows.

Table 11: Impact rating scales

CRITERIA	DESCRIPTION			
EXTENT	**National (4)** The whole country	**Regional (3)** Omusati region and neighbouring regions	**Local (2)** Within a radius of 2 km of the development site.	**Site (1)** Within the development site
DURATION	**Permanent (4)** Mitigation either by man or natural process will not occur in such a way or in such a time span that the impact can be considered transient	**Long-term (3)** The impact will continue/last for the entire operational life of the development but will be mitigated by direct human action or by natural processes thereafter.	**Medium-term (2)** The impact will last for the period of the project phase, where after it will be entirely negated	**Short-term (1)** The impact will either disappear with mitigation or will be mitigated through natural process in a span shorter than the construction phase
INTENSITY	**Very High (4)** Natural, cultural, and social functions and processes are altered to extent that they permanently cease	**High (3)** Natural, cultural, and social functions and processes are altered to extent that they temporarily cease	**Moderate (2)** Affected environment is altered, but natural, cultural, and social functions and processes continue albeit in a modified way	**Low (1)** Impact affects the environment in such a way that natural, cultural, and social functions and processes are not affected
PROBABILITY	**Definite (4)** Impact will certainly occur	**Highly Probable (3)** Most likely that the impact will occur	**Possible (2)** The impact may occur	**Improbable (1)** Likelihood of the impact materialising is very low
SIGNIFICANCE	Is determined through a synthesis of impact characteristics. Significance is also an indication of the importance of the impact in terms of both physical extent and time scale, and therefore indicates the level of mitigation required. The total number of points scored for each impact indicates the level of significance of the impact.			

Table 12: Description of the significance of impacts

Low impact	A low impact has no permanent impact of significance. Mitigation measures are feasible and are readily instituted as part of a standing design, construction, or operating procedure.
Medium impact	Mitigation is possible with additional design and construction inputs.
High impact	The design of the site may be affected. Mitigation and possible remediation are needed during the construction and/or operational phases. The effects of the impact may affect the broader environment.
Very high impact	Permanent and important impacts. The design of the site may be affected. Intensive remediation is needed during construction and/or operational phases. Any activity which results in a "very high impact" is likely to be a fatal flaw.
Status	Denotes the perceived effect of the impact on the affected area.
Positive (+)	Beneficial impact
Negative (-)	Deleterious or adverse impact.
Neutral (/)	Impact is neither beneficial nor adverse
It is important to note that the status of an impact is assigned based on the status quo. Therefore, not all negative impacts are equally significant.	
Significance Rating Scale Points 1-4 Insignificant/low Points 5-8 Significant /Moderate Points 9-12 Very significant/High. Points 13-16 Highly significant /Very high	

The significance of each impact has been rated before and after mitigations measures. The implementation of mitigations is expected to reduce the significance of impacts by means of at least two (2) scales.

9.2 Anticipated impacts: planning and design phase.

The first step in avoiding and preventing any possible negative impacts associated with any project, should start with the planning and designing phase. Issues to be considered at the planning and design phase of the proposed Outapi WTP are as follows.

a) Siting of plant infrastructures
b) Plant Capacity
c) Electricity/power availability/sufficiency
d) Traffic flow

- *Siting of plant infrastructures (pump station)*

According to the preliminary design, all components of the new plant are to be housed within the existing perimeter fence, expect for the pump station which is located on the area next to the canal. The area between the plant area and the canal, including the proposed site for the pump station has water depression feature and is prone to flooding. Although, the placement of the pump station next to the canal was considered from the engineering perspective, it may result in significant impacts to the local hydrology. Accessibility to the site mighty also be disrupted during the rainy season or during flood occurrence.

Moreover, locating the pump station outside the plant mighty be risky for the operator/s on duty, especially during night times. Since the pump station is outside the fenced and guarded area, it may also be subjected to vandalism by the members of the public.

Measures:

The existing fence should be extended to include the proposed pump station and inlet works. Existing security measures around the plant should be maintained to protect the properties from vandalism and assure the safety of operators while on duty. In addition, provision must be made for the access road which is above the flood level to ensure site access during rainy season. The construction of the access road must also make provision for the free flow and drainage of flood water.

- *Plant Capacity*

The proposed design WTP capacity is 283 m^3 /hr. The proposed plant capacity was estimated based on the projected water contained in the water supply situation assessment by Knight Piesold Consultant, (2016). However, considering the current water demand and population growth of the supply area, this projection is considered too low. The projections were done five years back and a lot has changed in terms of population growth and increased in economic development of the area. Moreover, these projections were based more on urban population and did not cover explicitly the population and economic dynamics of the rural part of the supply area.

Measures:

The project team has requested the Design Consultant to provide NamWater with a financial proposal to carry out investigations into possible ways of making provision for the treatment plant capacity to be upgraded at a later stage.

- *Electricity/power availability/sufficiency*

The existing electricity transformer feeding the plant has an output capacity of 200 kVA. The proposed plant requires about 800 kVA. Hence, the current power supply is not sufficient to accommodate the treatment plant with the required capacity.

Measures:

It is recommended that the existing transformer (200 kVA) be replaced with a transformed with high capacity to accommodate the proposed WTP with the required capacity. Provision should also be made for standby generator to be used in case of power failure.

- *Provision for Parking space*

Currently, there is no designated parking space for customers and staff members. This has caused disruption of the traffic flows in the streets adjacent to the Outapi WTP due to vehicles parking on streets.

Measures:

NamWater agreed to provide ample parking space for staff, visitors, customers etc.

9.3 Anticipated negative impacts: construction phase.

It must be noted that the proposed development is taking place within the existing Outapi WTP area. Hence, the potential impacts of the proposed works on the biophysical environment are somehow limited to the physical settings of the site. The anticipated potential negative impacts during construction will affect both the biophysical and socio-economic environments. These are as follows.

a). Negative impacts to the natural environment.

- Disturbance to local flora and fauna
- Soil compaction and contamination
- Disturbance of the local geology
- Dust and air pollution

b). Negative impacts to the socio-economic environment.

- Nuisance
- Traffic and road safety
- Safety, security, and health hazards
- Waste generation
- Danger of fire
- Water requirements
- Energy requirements and consumption

These impacts have been explained in detail below.

- *Disturbance to local flora and fauna*

The construction works will cause disruption to the local ecological setting. The ecological setting refers to the biophysical characteristics that strongly influence the composition, structure and functioning of a particular ecosystem. Ecological setting is vital for sustaining life of trees, wild animals, livestock, and people. The long-term operation of the plant has created new habitats for fauna and flora onsite. Detriment to fauna and flora could thus happen during construction, demolition, and removal of onsite infrastructures.

Impact Type	**Ratings (before mitigation/measures)**				**Significance**	
	Extent	Duration	Intensity	Probability	Without measures	With measures
Negative	*1*	*1*	*1*	*1*	*4*	*2*

Mitigation: The potential ecological impacts will occur at small scale as it is only limited to the development site. However, to minimize the potential impacts to the local flora and fauna, ensure that only vegetation that are directly affected by the construction works are cleared and avoid intentional hurt, trap, kill of animals and unnecessarily disturbance of their habitats i.e., bird nests etc.

- *Soil compaction and contamination*

Removal and compaction of soil are part and parcel of construction activities. If not properly handled, it could result into soil erosion, especially during rainy season. Other impacts on soil are contamination from poor handling and spillage of lubricants and chemicals i.e., oil, grease released from construction vehicles and equipment.

Impact Type	**Ratings (before mitigation/measures)**				**Significance**	
	Extent	Duration	Intensity	Probability	Without measures	With measures
Negative	*1*	*2*	*1*	*2*	*4*	*2*

Mitigation: While soil compaction is a requirement for construction works the disturbance must be limited to the construction site. To reduce soil contamination, contractors should provide proper maintenance to their construction vehicles and machineries. All leakages and spills of oil, grease etc, should be contained, cleaned up and disposed of to the Outapi waste disposal site. Drip trays should be provided for vehicles and machines with leakages.

- *Disturbance of local geology*

The disturbance of the local geology and soil may occur as result of demolition and excavation as well as during the development of foundations. The alteration of topography due to excavations and bulk earth works may also disturb the surface geology.

Impact Type	**Ratings (before mitigation/measures)**				**Significance**	
	Extent	Duration	Intensity	Probability	Without measures	With measures
Negative	*1*	*1*	*1*	*2*	*5*	*3*

Mitigation: The disturbance of soil and geology associated with the demolition and construction is inevitable. However, all site disturbances should be limited to the areas where structures will be constructed. Moreover, recommendations from the geotechnical assessment should be adhered to.

- *Dust and air pollution*

Excavation and construction related activities will generate dust that will have a negative impact on the surrounding area and beyond. Moreover, trucks transporting construction material to the disposal site, will cause dust pollution to streets they would be passing through, unless they are properly covered. However, the worst case of dust pollution would be during windy conditions. Other atmospheric pollution is in the form of fumes and noxious gases i.e., hydrocarbon vapours, carbon monoxide and sulphur oxides released from vehicles and construction equipment.

Impact Type	**Ratings (before mitigation/measures)**				**Significance**	
	Extent	Duration	Intensity	Probability	Without measures	With measures
Negative	*1*	*1*	*2*	*2*	*6*	*4*

Mitigation: Ensure dust control measures such as sprinkler all haulage roads and construction areas with reused water. All construction vehicles and machineries must be road worthy and driven within the maximum driving speed limits. Cover dump trucks loaded with sand or other building materials with tarpaulin.

- *Nuisance*

According to the National Labour Act 11 of 1992, a nuisance is described as noise, dust, vibration, and odour. These impacts are subjective based on the public perceived views. It will also depend on the concerned person's perception of what constitutes a nuisance.

Noise pollution and vibration are negative impacts that will surely result from operating construction equipment such as cranes, trucks, drilling, etc. The worst-case scenario is when these impacts occur during night hours or midday. The process of transporting all construction debris may also constitute a nuisance to residents around the site and may not be aesthetically acceptable.

Impact Type	**Ratings (before mitigation/measures)**				**Significance**	
	Extent	Duration	Intensity	Probability	Without measures	With measures
Negative	*1*	*1*	*1*	*2*	*5*	*3*

Mitigation: The occurrence of noise impacts will only be temporary and can be mitigated by adhering to the noise instructions. In addition, all construction activities must be limited to normal working hours (08:00-17:00) and avoid operating during odd hours.

- *Traffic disturbances*

The negative traffic impacts resulting from construction activities are mainly due to movement of construction vehicles in and out of the site. Therefore, normal traffic movement, especially in streets in the vicinity of the construction site may be slightly disrupted during the construction period.

Impact Type	Ratings (before mitigation/measures)				Significance	
	Extent	Duration	Intensity	Probability	Without measures	With measures
Negative	*1*	*1*	*1*	*2*	*5*	*3*

Mitigation: The contractor must erect construction signages at the construction site. Construction vehicles must be driven by authorized drivers only and stick to the maximum speed limits of 40 km/hr. in urban areas. Heavy-duty vehicles and machinery must be tagged with reflective signs or tapes to maximize visibility and avoid accidents.

- *Migrant construction workers*

Temporary construction activities may cause movement of people from different parts of the country in search for employment opportunities. Migrant construction workers are likely to engage in casual relationships with locals. This will result in unplanned pregnancies and may contribute to the spread of HIV/AIDS, especially among youth and school children.

Impact Type	Ratings (before mitigation/measures)				Significance	
	Extent	Duration	Intensity	Probability	Without measures	With measures
Negative	*1*	*1*	*1*	*1*	*4*	*4*

Mitigation: Recruit local people as far as possible to avoid migration of people from other areas. Provide health education and awareness on the risk of HIV/AIDS.

- *Safety and health hazards*

Occupational health hazards are expected particularly in relation to the construction workers who will be present at the site. Workers will be exposed to dust, vibrations, high noise levels, sun exposure (sun stroke) and dehydration during summer months. The safety of visitors, clients, staff, and public may be compromised by the construction activities.

Impact Type	Ratings (before mitigation/measures)				Significance	
	Extent	Duration	Intensity	Probability	Without measures	With measures
Negative	*1*	*1*	*2*	*2*	*6*	*4*

Mitigation: All construction workers must be provided with Personal Protective Equipment (PPE). Employees must also be trained on nature of their jobs and made aware of potential hazards at their workplace. Ensure that, there is a safety representative who is equipped with first aid kit at the construction site. The construction site must be barricaded and out of bound for the public and visitors. Bring in some detail on Covid. The document will be incomplete without appropriate Covid mitigation.

- *Waste generation*

The demolition / decommissioning of existing facilities such as buildings and pipelines will result in generation of different types of waste, including hazardous waste i.e., asbestos. Asbestos can be dangerous to human health if not properly removed and disposed of in the right way. Other types of waste such as spoil materials, domestic waste, and liquid waste will also be generated from construction activities. All these types of waste will have a negative impact on surrounding areas if not disposed of properly and regularly. In addition, the process of transporting all construction debris may also disturb neighbouring areas and constitute a nuisance to residents around the site and may not be aesthetically accepted.

Impact Type	**Ratings (before mitigation/measures)**				**Significance**	
	Extent	Duration	Intensity	Probability	Without measures	With measures
Negative	*1*	*1*	*2*	*2*	*6*	*4*

Mitigation: All general waste generated at the site must be gathered and disposed to the Outapi waste disposal site. Vehicles transporting waste should be sealed with a tarpaulin to avoid waste from being blown away by wind. In case the existing ablution facilities are found not suitable or sufficient for construction workers, provision must be made for a potable ablution facility during the construction period. Construction camps must be established on approved site and on existing site with impervious surface.

- *Generation of hazardous materials/waste*

The decommissioning of certain existing WTP infrastructures such as the demolishing of the existing asbestos pipeline from the canal to the treatment works and the existing chlorine & flocculant dosing system will result in generation of hazardous substances.

Impact Type	**Ratings (before mitigation/measures)**				**Significance**	
	Extent	Duration	Intensity	Probability	Without measures	With measures
Negative	*1*	*1*	*2*	*2*	*6*	*4*

Mitigation: Record all hazardous substances on site. Asbestos should ONLY be handled by Approved Inspection Authority as per regulation 18 of the regulations relating to Health and Safety of Employees at Work made under Schedule 1 (2)(2) of the Labour Act, 2007 (Act No. 11 of 2007). For the list of Approved Inspection Authorities in Namibia, the Chief Inspector: Occupational Health and Safety can be contacted at (061) 2066111.

- *Water requirements and consumption*

Construction activities will require substantial amount of water. If not properly planned and monitored, it will increase the local water demand during the construction period.

Impact Type	Ratings (before mitigation/measures)				Significance	
	Extent	Duration	Intensity	Probability	Without measures	With measures
Negative	*1*	*1*	*1*	*2*	*5*	*3*

Mitigation: Raw water that meets construction quality guidelines must be used for construction activities as far as possible. Contractors must be informed to use water sparingly and apply water conservation measures i.e., re-use water for less important activities, flush-less etc.

- *Energy requirements and consumption*

Construction activities may increase local energy consumption and demand.

Impact Type	Ratings (before mitigation/measures)				Significance	
	Extent	Duration	Intensity	Probability	Without measures	With measures
Negative	*2*	*1*	*1*	*1*	*5*	*3*

Mitigation: Upgrade the transformer for the treatment plant before construction and investigate the possible alternative energy generation i.e., generator, solar as back-ups.

- *Visual and aesthetic intrusion*

Uncollected waste stockpile will reduce the visual appearance of the site.

Impact Type	Ratings (before mitigation/measures)				Significance	
	Extent	Duration	Intensity	Probability	Without measures	With measures
Negative	*1*	*1*	*1*	*1*	*4*	*2*

Mitigation: Ensure the site is kept neat during construction period by tiding up daily and removal of waste weekly.

- *Criminal activities*

Construction materials and untended equipment kept onsite may attract criminals.

Impact Type	Ratings (before mitigation/measures)				Significance	
	Extent	Duration	Intensity	Probability	Without measures	With measures
Negative	*1*	*1*	*1*	*1*	*4*	*2*

Mitigation: Materials and equipment that will be stored in locked rooms or must be placed in a way that does not attract criminals.

9.4 Anticipated negative impacts: operation phase.

The operation phase of the proposed Outapi WTP will equally result in several negative impacts to the biophysical and socio-economic environment. The identified potential negative impacts during the operation phase are as follows:

- nuisance
- public health and safety risk
- exposure to chemicals and hazardous substances
- waste generation
- risk of fire
- traffic disturbances
- limited skills to operate the new WTP.
- energy requirements and consumption
- Visual and aesthetic intrusion
- Increase in criminal activities.

These impacts are explained din detailed below.

- *Nuisance*

The main source of nuisance during the operation phase are the excessive noise from running pumps, especially if not properly maintained. There is possibility of bad odors from build-up sludge in the sludge ponds.

Impact Type	Ratings (before mitigation/measures)				Significance	
	Extent	Duration	Intensity	Probability	Without measures	With measures
Negative	*1*	*1*	*1*	*1*	*4*	*2*

Mitigation: The pumps are to be housed in one room, hence the noise generated will not be emitted to the surrounding. Operators and maintenance staff must be equipped with earmuffs when entering the pump station. Ensure regular collection of sludge and cleaning of sludge ponds to avoid bad odour.

- *Public health and safety risks*

Potential health and safety risks that are associated with the plant operation are such as risk of falling and drowning of maintenance staff. Moreover, sludge ponds and other WTP structures could be breeding ground for diseases carrying vectors such as mosquitoes, flies, snails etc.

Impact Type	Ratings (before mitigation/measures)				Significance	
	Extent	Duration	Intensity	Probability	Without measures	With measures
Negative	*1*	*1*	*1*	*2*	*5*	*3*

Mitigations: Maintenance staff must be trained on the potential occupation risks associated with their job and always equipped with PPE and safety gears. The area must be kept neat and tidy by providing regular maintenance and cleaning of the storage dam, sludge ponds and surroundings. Ornamental plants and trees must be properly trimmed and well looked after and by keeping away unwanted vegetation.

- *Exposure to chemicals and hazardous substances*

The plant maintenance staff will be exposed to different types of chemicals that are used in the disinfection system such as chlorine, flocculant, lime, carbon dioxide etc. The risk of exposure can be aggravated by factors such lack of awareness, lack of protection, physical fatigue etc.

Impact Type	Ratings (before mitigation/measures)				Significance	
	Extent	Duration	Intensity	Probability	Without measures	With measures
Negative	*1*	*2*	*2*	*2*	*7*	*5*

Mitigations: Training must be provided to all maintenance staff, especially to the new operators and awareness must be provided on the danger of chemical exposure as well as first-aid response in case of accidents. Chemicals must be handled and stored according to the material safety data sheet (MSDS). A first aid kit must always be kept at the workplace and emergency exists must be clearly stipulated on the building and chemical storage rooms. If possible, the disinfection rooms must be locked or out of bound for unauthorized entries. Only staff that are well-trained and that responsible for the disinfection system may always operate the system.

- *Waste generation*

The operation of the treatment plant will result in generation different types of waste. This waste will be generated from different plant operations as follow.

  - Water treatment: debris from raw water screening and sludge
  - Plant supply: empty containers and packaging materials
  - Office operations: general waste i.e., papers, cans etc.
  - Maintenance and repair e.g., oil, lubricants, worn out parts etc.
  - Sludge from backwash and sedimentation process

All these types of waste can pose serious health risks if not properly handled and disposed of correctly.

Impact Type	Ratings (before mitigation/measures)				Significance	
	Extent	Duration	Intensity	Probability	Without measures	With measures
Negative	*1*	*1*	*2*	*2*	*6*	*4*

Mitigation: Only General household waste should be disposed of in the municipal refuse bins for disposal at the Outapi dumping site. Follow the waste management hierarchy in managing waste as outlined in the EMP. Worn-out parts can be collected and sent to the local scrap yards. All empty disinfectants containers should be sent to the local recycling companies or properly cleaned before re-use. Hazardous waste such as used oil, paints, unused chemicals etc., should be collected separately and sent to Windhoek or Walvis Bay landfill sites. Sludge from sludge dams should be collected and disposed of at the OTC dumping site and should not be buried onsite.

- *Risks of fire*

Sources of fire outbreaks during operations could be electrical shocks and due to the presence of combustible and flammable items i.e., fuel.

Impact Type	Ratings (before mitigation/measures)				Significance	
	Extent	Duration	Intensity	Probability	Without measures	With measures
Negative	*1*	*1*	*1*	*1*	*4*	*2*

Mitigations: Follow the Fire Response Procedure as per Annexure 3 of the EMP. This plan includes an emergency response plan, firefighting plan, and spill recovery plan. All combustible and flammable items should be stored and handled according to the respective MSDS.

- *Traffic disturbances*

Currently there is no designated parking space for customers and staff members at Outapi WTP. This has caused disruption of the traffic flows due to vehicles parking in the street.

Impact Type	Ratings (before mitigation/measures)				Significance	
	Extent	Duration	Intensity	Probability	Without measures	With measures
Negative	*1*	*1*	*1*	*1*	*4*	*2*

Mitigations: Provision must be made for a designated ample parking space for customers and NamWater staff. NamWater agreed to provide ample parking space for customers and employees.

- *Limited skills to operate the new WTP.*

The operation of the proposed WTP will require well skilled personnel. Lack of skill to operate the plant components could cause malfunctioning of the WTP and interrupt water supply process.

Impact Type	Ratings (before mitigation/measures)				Significance	
	Extent	Duration	Intensity	Probability	Without measures	With measures
Negative	*1*	*1*	*1*	*1*	*4*	*2*

Mitigations: The operators at the plant will be trained to successfully operate the new WTP.

- *Energy requirements and consumption*

The proposed WTP will require a substantial amount of electricity (800 kVA) during operation. Information provided by the plant operation team is that, due to the lack of back-up power supply, the operation of the current WTP is sometimes disrupted during power outage.

Impact Type	Ratings (before mitigation/measures)				Significance	
	Extent	Duration	Intensity	Probability	Without measures	With measures
Negative	*2*	*2*	*2*	*1*	*7*	*5*

Mitigations: The transformer feeding the current plant must be upgraded to match the power requirements of the proposed WTP. Provision must be made for a standby generator to be used in case of power failure.

- *Visual and aesthetic intrusion*

The presence of uncollected waste, litters and overgrown vegetation around the site could be visual unattractive to customers and visitors.

Impact Type	Ratings (before mitigation/measures)				Significance	
	Extent	Duration	Intensity	Probability	Without measures	With measures
Negative	*1*	*1*	*1*	*2*	*5*	*3*

Mitigations: Avoid littering by providing sufficient refuse bins and keep the area clean and free of overgrown vegetation. Plant adaptable plants species i.e., guava, mangoes, lemon etc. around the site to improve the aesthetic view.

- *Increase in criminal activities.*

The proposed WTP infrastructures i.e., fences, storage dam, pumps, meters etc. are at risk of vandalism from the member of the public if not properly guarded.

Impact Type	Ratings (before mitigation/measures)				Significance	
	Extent	Duration	Intensity	Probability	Without measures	With measures
Negative	*1*	*1*	*1*	*2*	*5*	*3*

Mitigations: Ensure regular security measures around the site and regular inspections for all plant infrastructures as well as regular maintenance of the perimeter fence around the site.

9.5 Anticipated positive impacts

The proposed development will also result in several positive impacts during the construction and operation phases. However, certain enhancement measures must be implemented to fully realize such positive impacts.

a). During Construction

- Job opportunities for locals
- Business opportunities

b). During operation

- Permanent employment opportunities
- Provision of water security
- Contribution to economic and social development

These are explained in detail here below.

- Job opportunities for locals

The construction of the proposed treatment plant will create about 30 temporary employment opportunities. The level of skills required for the construction works include both unskilled, semi-skilled and skilled personnel in common fields such as civil, electrical, and mechanical.

Enhancement measures.

The recruitment of local people for the temporary opportunities is highly recommended given the local unemployment rate and job scarcity.

- Business opportunities

The construction works will create business opportunities to consultants, building contractors and local suppliers of building materials. Other local businesses such as hotels and street vendors will also benefit indirectly from the construction works.

Enhancement measures.

Building materials must be sourced from local businesses as far as possible. Qualified Namibian construction companies should be given fair chance to compete in the bidding process.

- *Permanent employment opportunities*

The construction of a new treatment plant will result in creation of additional permanent job opportunities such as cleaner, operators etc.

Enhancement measures

Training must be provided to all plant maintenance crew to ensure smooth operations of the plant.

- *Provision of water security*

One of the significant positive impacts that will result from the proposed WTP is the improved water security of the supply area. The notion that “Water is life” is not just a mere exaggeration but a reality. Hence, the increased treatment capacity will ensure a reliable supply of safe drinking water to the local communities.

Enhancement measures

The proposed plant capacity must take into consideration the current situation in the whole supply area by considering factors such as, population growth, urbanisation, economic and social development of both urban and rural communities in the supply area.

- *Contribution to economic and social development*

The improved water security will contribute to the growth of the local economy by attracting investments and development in the area.

Enhancement measures

There is a need for a comprehensive water demand management plan for the area which should be shared with all relevant authorities such as the OTC and the ORC. Approval for all future developments in the supply area, should be subjected this water demand management plan to keep tract of water demand of the supply area.

9.6 Decommissioning phase

9.6.1 Decommissioning of existing plant components

Decommissioning is required for certain existing components that will become obsolete upon the commissioning of the new WTP. The decommissioning will entail the removal of all obsolete and unwanted infrastructures. The potentials impacts associated with the decommissioning activities include generation of dust, noise, disturbance of soil and production of different types of waste as structures are dismantled. Most of these impacts have already been included in the assessment above, thus appropriate mitigation measures should be implemented as outlined above and as contained in the EMP.

9.6.2 Decommissioning the proposed plant

The decommissioning of the proposed WTP is not foreseen during the validity of the ECC. Should the new WTP or its component be decommissioning at any stage, an EIA for the decommissioning process should be undertaken by the proponent. The EMP for the WTP will have to be reviewed at the time of decommissioning to cater for changes made to the site and implement guidelines and mitigation measures. Furthermore, the proponent should consult with the relevant authorities prior to any proposed demolition and removal of site infrastructure to best mitigate any potential impacts.

10. CONCLUSION AND RECOMMENDATIONS

10.1 Conclusion

The objective of the Scoping phase of the EIA study was to define the range of the impact assessment and to determine the need to conduct any specialist study. It is believed that this objective has been achieved and adequately documented in the Scoping Report. Hence, the EAP and the proponent have agreed to conclude this EIA at the scoping level without the need for a detailed EIA process. Moreover, all possible environment aspects associated with the proposed project have been adequately assessed and necessary control measures have been formulated to meet statutory requirements. Since there were no objections received from the I&APs or stakeholders, it is assumed that the proposed new Outapi WTP is well received by all.

10.2 EAP recommendations

a). Recommendations to the proponent (NamWater)

- Request NORED to upgrade the existing electricity transformer (200 kVA) to match the capacity of the proposed treatment plant, i.e., 800 kVA.
- In collaboration with other stakeholders i.e., OTC, ORC, develop a water demand management plan for the Outapi WTP supply area.
- Ensure the implementation of the EMP during all project phases.

b). Recommendation to the competent authority (DWA) and DEAF

- Approve the findings of the Scoping process and mitigation measures contained in the Scoping (this report).
- When deemed necessary, attach any condition/s to ensure environmental compliance and for the proposed project to meet statutory requirements.
- Authorize the issuance of the Environmental Clearance Certificate to NamWater Ltd., for the construction, operation, maintenance and decommissioning of the proposed Outapi WTP.

11. REFERENCES

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12. APPENDICES

12.1 Appendix A: Microbiological Water Test Results

12.2 Appendix B: Monthly Sales figures 2016-2020

12.3 Appendix C: Water Consumption for OTC

12.4 Appendix D: Proof of Consultations

12.5 Appendix E: Curriculum Vitae

12.6 Appendix F: EMP