

INFORMATION ON THE METHODOLOGY ADOPTED IN THE ASSESSMENT OF IDENTIFIED IMPACTS

The methodology adopted for the assessment of identified impacts is the Impact Rating Matrix, which is explained below.

NATURE: The character of the impact			
EXTENT	DURATION	PROBABILITY	MAGNITUDE
Area	Time Frame	Likelihood	Intensity of impact to destroy or alter the environment.
IRREPLACEABLE LOSS OF RESOURCES	This describes the degree to which resources will be irreplaceably lost as a result of a proposed activity.		
REVERSIBILITY	This describes the degree to which an impact can be successfully reversed upon completion of the proposed activity		
SIGNIFICANCE: Implication of the impact both with or without mitigation			
TYPE: Description as to whether the impact is negative or positive or neutral.			
MITIGATION: Possible impact management, minimization, and mitigation of the identified impacts.			

Nature of Impact

Nature of impact describes the character of the impact in terms of the effect on the relevant environmental aspect.

Spatial Extent of Impact

Measures the area extent, physical and spatial scale over which the impact will occur. This implies the scale limited to the Project Site (footprint) - including adjacent areas, or the town and neighbouring areas (localized), or the Local Municipality area (regional) or the entire Province (Provincial), or the entire country (National) or beyond the borders of South Africa.

Criteria	Footprint/ Surroundings (F)	Site/Local (S-L)	Regional (R)	Provincial (P)	National and Beyond (International) (N)
Rating	1	2	3	4	5

Duration of Impact

Duration measures the timeframe of the impact in relation to the lifetime of the project. It gives an assessment of whether the impact can be eliminated by mitigation immediately (0-1 year) after a short time (1-5 years), medium term (5-10 years), long term (11- 30 years of the Project activities), or permanent (persists beyond life) due to the Project activities.

Criteria	Temporary (T)	Short Term (ST)	Medium Term (MT)	Long Term (LT)	Permanent (P)
Rating	1	2	3	4	5

Magnitude/Intensity of Impact

Magnitude or intensity of the impact measures whether the impact is destructive or benign, whether it destroys, alters the functioning of the environment, or alters the environment itself. It is rated as insignificant, low, medium, high or very high.

Criteria	Very Low (VL)	Low (L)	Medium (M)	High (H)	Very High (VH)
Rating	2	4	6	8	10

Irreplaceability of Natural Resources being impacted upon

This describes the degree to which resources will be irreplaceably lost as a result of a proposed activity.

Criteria	Very Low (VL)	Low (L)	Moderate (M)	High (H)	Definite (D)
Rating	1	2	3	4	5

Reversibility of Impact

This describes the degree to which an impact can be successfully reversed upon completion of the proposed activity

Criteria	Reversible (R)	High Reversibility (HR)	Moderate Reversibility (MR)	Low Reversibility (LR)	Irreversible (IR)
Rating	1	2	3	4	5

Probability of Impact

Probability measures the probability or likelihood of the impact occurring, as either probable, possible, likely, highly likely or definite (impact will occur regardless of preventative measures).

Criteria	Probable (PR) (0-10%)	Possible (PO) (10-25%)	Likely (L) (25-50%)	Highly Likely (HL) (50-75%)	Definite (D) (75-100%)
Rating	1	2	3	4	5

Significance of Impact

Significance measures the foreseeable significance of the impacts of the Project both with and without mitigation measures. The significance on the aspects of the environment is classified as:

Significance Score (SS) =	(Extent + Duration + Magnitude + Irreplaceability + Reversibility) x Probability
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The Significance Score is then used to rate the Environmental Significance of each potential environmental impact with or without mitigation.

**PROPOSED TWEEFONTEIN GAUGING WEIR, BOTHAVILLE
NALA LOCAL MUNICIPALITY
EMB/12(i)(a),19,12(b)(iv)/23/06**

Significance Score	Significance Rating	Description/ Criteria
125-150	Very High	the impact will result in large, permanent and severe impacts, such as local species extinction, minor human migrations or the local economy collapses; even projects with major benefits may not go ahead with this level of impact; project alternatives which are substantially different should be looked at, otherwise, the project should not be approved.
100-124	High	the impact will affect the environment to such an extent that permanent damage is likely, and recovery will be slow and difficult; the impact is unacceptable without significant mitigation efforts or reversal plans; project benefits must be proven to be very substantial; the approval of the project will be in jeopardy if this impact cannot be addressed.
75-99	Medium-High	the impact is significant and will affect the integrity of the environment; effort must be made to mitigate and reverse this impact; in addition, the project benefits must be clearly shown as outweighing the negative impact.
50-74	Medium	the impact will be noticeable but should be localised or occur over a limited time period and not cause permanent or unacceptable changes; it should be addressed in the EMPr and managed appropriately.
<50	Low	the impact should cause no real damage to the environment, except where it could contribute to cumulative impacts.
+	Positive Impact	A positive impact is likely to result in a beneficial consequences/effect and should therefore be viewed as a motivation for the development

IMPACT ASSESSMENT

PLANNING AND DESIGN PHASE

ASPECT: GAUGING WEIR DESIGN		
NATURE OF IMPACT: Poor design of the gauging weir that could collapse and create a migration barrier to fish and other mobile aquatic fauna.		
Status (positive or negative)	Negative	
	Without Mitigation	With Mitigation
Extent	Regional (3)	Local (2)
Duration	Long term (4)	Long Term (4)
Magnitude	Very High (10)	Very Low (2)
Irreplaceable loss of resources?	Definite (5)	Low (2)
Reversibility	Low (4)	High Reversibility (2)
Probability	Highly Likely (4)	Possible (2)
Significance	High (104)	Low (24)
Can impacts be mitigated or augmented	Yes	
Mitigation:		
<ul style="list-style-type: none"> ◇ The design must be able to meet the applicable engineering standards for gauging weir. ◇ The engineers responsible for the design must have the necessary skills and expertise. 		
Cumulative impacts:		
None, the existing storage weir will be demolished.		
Residual Impacts:		
Limited		
Discussion:		
The design of the gauging weir must meet applicable engineering standards to ensure that the weir meets the hydraulic performance and has the structural integrity that will not require excessive maintenance. With regards to the impact on the migration of aquatic species, a fish ladder is not included in the design because if it is to be included, then this will change the current migration patterns as a result of the existing weir, which also does not have a fish ladder. However, during floods, they will be able to migrate upstream because the proposed weir will be almost the same height as the existing weir, which will be used as a coffer during construction, and it will be demolished thereafter.		

ASPECT: Non-Compliance with applicable Environmental Legislation		
NATURE OF IMPACT: Commencement of the project without obtaining the necessary authorisation, licenses, or permits in terms of the applicable legislation constitute continuation of illegal activities.		
Status (positive or negative)	Negative	
	Without Mitigation	With Mitigation
Extent	Regional (3)	Regional (3)
Duration	Long term (4)	Temporary (1)
Magnitude	Very High (10)	Very Low (2)
Irreplaceable loss of resources?	High (4)	Very Low (1)
Reversibility	Low (4)	Reversible (1)
Probability	Definite (5)	Probable (1)
Significance	Very High (125)	Low (8)
Can impacts be mitigated or augmented	Yes	
Mitigation: ◇ The construction of the gauging weir must only commence once all the applicable authorisations are obtained. ◇ Application for Environmental Authorisation in terms of National Environmental Management Act (Act 107 of 1998) as amended in progress. ◇ The applicant is the administering authority of the National Water Act (Act 36 of 1998), thus will ensure that the provisions of the act are met. ◇ Borrow pits that will be used to source construction material must have a Mining Permit/ Right in terms of Mineral Petroleum Resources Development Act (28 of 2002) and Environmental Authorisation in terms of NEMA, 1998 as amended or alternatively, material must be obtained from a commercial quarry.		
Cumulative impacts: None		
Residual Impacts: High		
Discussion: Should the applicant go ahead with the construction of the proposed gauging weir without obtaining the necessary approvals from competent authorities, they will be in contravention of the applicable environmental legislation and this could result in an administration fine or jail term.		

CONSTRUCTION PHASE:

ASPECT: SOCIO-ECONOMIC		
NATURE OF IMPACT: Employment opportunities for the local community and procurement of local services/goods during construction phase.		
Status (positive or negative)	Positive	
	Without Mitigation	With Mitigation
Extent	Provincial (4)	Local (2)
Duration	Short term (2)	Short term (2)
Magnitude	Medium (6)	Low (4)
Irreplaceable loss of resources?	Very Low (1)	Very Low (1)
Reversibility	Irreversible (5)	Irreversible (5)
Probability	Probable (2)	Highly Likely (4)
Significance	Low (36)	Medium (56)
Can impacts be mitigated or augmented	Yes	
<p>Mitigation: No mitigation is required because it is a positive impact, however, it can be augmented by the following:</p> <ul style="list-style-type: none"> ◇ Local labourers in consultation with Nala Local Municipality and ward councillors and general workers must be sourced locally through a transparent process. ◇ Local sub-contractors and SMMEs should be utilized to a greater extent. ◇ Work force should include youth, women and disabled. Expanded Public Works Programme targets should be met. ◇ Labour intensive construction methods should be adopted where possible. ◇ Community Liaison Officer should be appointed, and Project Steering Committee established prior to construction to ensure that all social issues are resolved, and the project does not result in any delays due to unresolved social issues, e.g., recruitment of local labourers. ◇ Appropriate training should be provided as well as skills development for the local sub-contractors to improve their CIBD grading level. 		
<p>Cumulative impacts: None expected</p>		
<p>Residual Impacts: The general workers would have gained experience and skill to work in similar projects in the future and CIBD grading of sub-contractors will improve.</p>		
<p>Discussion: It is important to involve the Local Authority and councillor during labour recruitment to avoid disgruntled community and process must be transparent. It is important that the contractor only uses skilled labourers from other areas if they are not available in the Bothaville/Kgotsoong area and general workers will be from Bothaville/Kgotsoong. There should be a database of local sub-contractors that will be empowered from this project. . Skills audit must be undertaken to determine accredited training that could be offered to the general workers or empower the SMMEs.</p>		

ASPECT: FLORA		
NATURE OF IMPACT: Clearance of indigenous vegetation for the establishment of the access road and site camp resulting in the destruction of Red Data Listed, Nationally and/or Provincially protected species.		
Status (positive or negative)	Negative	
	Without Mitigation	With Mitigation
Extent	Regional (3)	Site (2)
Duration	Long Term (4)	Long Term (4)
Magnitude	Low (4)	Very Low (2)
Irreplaceable loss of resources?	Moderate (3)	Low (2)
Reversibility	Low (4)	High (2)
Probability	Highly Likely (4)	Likely (1)
Significance	Medium (72)	Low (12)
Can impacts be mitigated or augmented	Yes	
Mitigation:		
<ul style="list-style-type: none"> ◇ Vegetation clearance must be limited to the development footprint of the construction camp on the left bank. ◇ Adequately cordon-off the proposed development construction footprint area and to ensure that the construction machinery and equipment is within the proposed construction footprint area and to ensure environmentally responsible construction practices and activities. ◇ No unnecessary/unauthorised footprint expansion into the surrounding undeveloped areas must take place. ◇ No new temporary roads or tracks may be constructed or implemented outside the construction footprint as the existing access road branching off from Provincial Road R30 will be used. 		
Cumulative impacts:		
Low		
Residual Impacts:		
Limited		
Discussion:		
Although there are no Red Data Listed and nationally protected species, the contractor must ensure that the construction activities including movement of the construction machinery and vehicles are confined to the development footprint to lessen impact on the ecological characteristics of the site and surroundings to minimise indiscriminate destruction of vegetation.		

ASPECT: FLORA		
NATURE OF IMPACT: Destruction riparian of vegetation due to clearance of vegetation on the banks of Vals River.		
Status (positive or negative)	Negative	
	Without Mitigation	With Mitigation
Extent	Local (2)	Footprint (1)
Duration	Long Term (4)	Long Term (4)
Magnitude	High (8)	Very Low (2)
Irreplaceable loss of resources?	High (4)	Moderate (3)
Reversibility	Low (4)	Moderate (3)
Probability	Possible (2)	Probable (1)
Significance	Medium (44)	Low (14)
Can impacts be mitigated or augmented	Yes	
Mitigation: <ul style="list-style-type: none"> ◇ Adequately cordon off the proposed development construction footprint area to ensure that the construction machinery and equipment is within the proposed construction footprint area and to ensure environmentally responsible construction practices and activities. ◇ The degree and duration of the construction impacts of the proposed development on the small portion of Vals River must be minimised as far as practically possible. ◇ No unnecessary/unauthorised footprint expansion into the surrounding undeveloped areas must take place. ◇ Excavated soils must be reinstated in reverse order of removal to retain the correct stratification characteristics of alluvial soils within the riparian zones. 		
Cumulative impacts: Low		
Residual Impacts: Limited		
Discussion: The contractor must ensure that the construction activities including the movement of the construction machinery and vehicles are confined to the development footprint to lessen the impact on the ecological characteristics of the riparian vegetation. Riparian vegetation provides attractive habitat refuge to a wide diversity of species, which could be easily displaced by indiscriminate destruction of the riparian vegetation must be avoided.		

ASPECT: SOIL EROSION		
NATURE OF IMPACT: Clearing of vegetation and earthmoving activities could result in soil erosion as a result of increased runoff.		
Status (positive or negative)	Negative	
	Without Mitigation	With Mitigation
Extent	Local (2)	Local (2)
Duration	Long Term (4)	Medium Term (3)
Magnitude	Medium (6)	Very Low (2)
Irreplaceable loss of resources?	Low (2)	Very Low (1)
Reversibility	High (2)	High (2)
Probability	High (4)	Probable (1)
Significance	Medium (64)	Low (11)
Can impacts be mitigated or augmented	Yes	
Mitigation: ◇ Vegetation clearance must be done in phases to minimize the exposure of bare soil. ◇ Adequate Stormwater and Erosion Management measures must be implemented for the problematic erosion proposed sewer bridge areas in order to sufficiently manage stormwater runoff to prevent any significant erosion from occurring. These include measures to stabilize riverbanks within disturbed areas as well as areas subject to perpetual present erosional features making use of geotextiles, silt traps or silt fences along areas with steep slopes and gabions in areas that suffer greater erosional impacts. ◇ ECO must routinely inspect erosion management features for functionality. ◇ All excavations must be filled and rehabilitated before construction moves off site to abate channel and gulley formation.		
Cumulative impacts: Medium		
Residual Impacts: Limited		
Discussion: Routine inspection of the construction area must be done to ensure that any signs of erosion are attended to.		

ASPECT: SOIL		
NATURE OF IMPACT: Potential contamination of soil from oil leaks and spills of construction vehicles, machinery and equipment.		
Status (positive or negative)	Negative	
	Without Mitigation	With Mitigation
Extent	Regional (3)	Local (2)
Duration	Permanent (5)	Short Term (2)
Magnitude	Very High (10)	Very Low (2)
Irreplaceable loss of resources?	High (4)	Low (2)
Reversibility	Low (4)	High (2)
Probability	High (4)	Possible (2)
Significance	High (104)	Low (20)
Can impacts be mitigated or augmented	Yes	
Mitigation: <ul style="list-style-type: none"> ◇ Construction vehicles and equipment must be parked in designated areas. ◇ Vehicles must be kept in good working condition and regularly maintained, and spill kits must always be kept available for when spills have occurred. ◇ Any emergency repairs must be done on an impermeable surface. ◇ Machinery and vehicles must be serviced in designated areas outside the no-go area. ◇ Workers must be trained to use the spill kits to rectify any spills immediately and the importance of reporting a leaking vehicle or machinery timeously so that it can be scheduled for repairs. ◇ Records must be kept of any spills. ◇ All hazardous substances must be stored and handled on impervious substrates and bunded areas that are able to contain spillage. ◇ Contaminated soil is hazardous waste thus should be stored in a suitable container and contents to be disposed of at a Hazardous landfill site by a registered service provider. 		
Cumulative impacts: Low		
Residual Impacts: Limited		
Discussion: Regular checking of vehicles and machinery is important as well as the proper reporting channel that must be followed by the workforce in case of a spill or a leak. No servicing of any construction equipment within 100m of Vals River. It is important that the toolbox talks include detailed instruction of what must be done in case of accidental spillages or leaks and record keeping. To ensure that the soil on site is free of contamination.		

ASPECT: ALIEN INVASIVE SPECIES		
NATURE OF IMPACT: Spread of alien invasive species		
Status (positive or negative)	Negative	
	Without Mitigation	With Mitigation
Extent	Regional (3)	Site (2)
Duration	Long Term (4)	Short Term (3)
Magnitude	High (8)	Very Low (2)
Irreplaceable loss of resources?	High (4)	Very Low (1)
Reversibility	Low (4)	High (2)
Probability	High (4)	Probable (1)
Significance	Medium-High (92)	Low (10)
Can impacts be mitigated or augmented	Yes	
Mitigation: <ul style="list-style-type: none"> ◇ Construction activities must be limited to the development footprint. ◇ All the identified alien invasive species individuals must be actively eradicated from the assessment area and adequately disposed of in accordance with the National Environmental Biodiversity Act (Act 10 of 2004); Alien and Invasive Species Regulations, 2014. ◇ Adequate Alien Invasive Species Establishment Management and Prevention Plan compiled by a suitably qualified and experienced Ecologist must be implemented during the construction and operational phase. ◇ Areas within and immediately surrounding the proposed development footprint must be adequately rehabilitated as soon as practicably possible after construction in order to prevent significant alien invasive species establishment. ◇ Routine monitoring must be undertaken to control the spread of invasive species. ◇ An effort should be made to control present exotic vegetation that occurs within the riparian zones. 		
Cumulative impacts: Low		
Residual Impacts: Limited		
Discussion: The disturbance of soils will enhance the growth and recruitment of exotic and pioneering vegetation; therefore, the construction site must be kept weed and alien-free because if there is an infestation, it could spread to the surrounding undeveloped areas, and this could affect the neighbouring farm lands as well as displace indigenous vegetation.		

ASPECT: WATER QUALITY OF THE VALS RIVER		
NATURE OF IMPACT: Contamination of Vals River due to contaminated runoff from the construction site.		
Status (positive or negative)	Negative	
	Without Mitigation	With Mitigation
Extent	Regional (3)	Regional (3)
Duration	Short Term (2)	Short Term (2)
Magnitude	High (8)	Medium (6)
Irreplaceable loss of resources?	High (4)	Low (2)
Reversibility	Moderate (3)	Medium (3)
Probability	High (4)	Possible (2)
Significance	Medium-High (80)	Low (32)
Can impacts be mitigated or augmented	Yes	
Mitigation: <ul style="list-style-type: none"> ◇ If hydrocarbons or other chemicals are to be stored on site during the construction phase, the storage areas must be situated as far away as practicably possible from the watercourses. ◇ The storage areas must be adequately bunded in order to be able to contain a minimum of 150% of the capacity of the storage tanks/units. ◇ Adequate hydrocarbon and other chemical storage, handling, usage, and emergency spill procedures must be developed, and accidental spills must be reported and cleaned immediately. ◇ All relevant construction personnel must be sufficiently trained on- and apply these procedures during the entire construction phase. ◇ Erosion control of maintained and serviced disturbed areas must be implemented to avoid silts entering into aquatic habitats and impacting water quality downstream of the site. ◇ Adequate stormwater and erosion management measures must be implemented for the entire assessment area during the construction and operational phase. This must be done to ensure and sufficiently manage stormwater runoff, clean/dirty water separation towards the Vals River in order to ensure ecological integrity of the watercourses. ◇ If ready mix concrete is not to be used, concrete mixing must be done on impermeable surfaces at designated areas and no concrete mixing would be allowed within the watercourses. All visible remains of concrete must be physically removed as soon as possible and disposed to a suitable site. All used cement bags should be properly disposed after use or stored at a designated area before. ◇ No chemical toilets must be placed within 100m of the watercourse and they must be serviced and maintained regularly. 		
Cumulative impacts: Low		
Residual Impacts: Limited		
Discussion: Water quality degradation as a result of siltation of the watercourse through erosional features, fluid leaks, poor waste management, is a common issue for construction projects taking place		

within watercourses, therefore, the contractor must ensure that workforce including sub-contractor are trained on measures to be implemented to lessen the impact. Good construction practices must be in place.

ASPECT: IMPACT ON THE FLOW REGIME		
NATURE OF IMPACT: Diverting water flow of the Vals River.		
Status (positive or negative)	Negative	
	Without Mitigation	With Mitigation
Extent	Regional (3)	Site (2)
Duration	Short Term (2)	Short Term (2)
Magnitude	High (8)	Low (4)
Irreplaceable loss of resources?	High (4)	Low (2)
Reversibility	Low (4)	Moderate (3)
Probability	High (4)	Likely (3)
Significance	Medium-High (84)	Low (39)
Can impacts be mitigated or augmented	Yes	
Mitigation:		
<ul style="list-style-type: none"> ◇ Adequate stormwater measures must be implemented during the construction and operation phase to ensure continued flow of the watercourse. ◇ Existing storage weir and the new coffer dam will be used to divert the water flow and will be demolished immediately when construction of the weir is completed. ◇ Construction should be done during low flows as much as possible. ◇ The construction footprint through all these portions must also be adequately rehabilitated as soon as practicably possible after construction in order to ensure the continued flow and subsequent ecological functionality and integrity of the watercourse and wetland. ◇ A Rehabilitation Management Plan must be developed for this by a suitably qualified and experienced Ecologist. 		
Cumulative impacts:		
Low		
Residual Impacts:		
Limited		
Discussion:		
During construction activities, two coffer dams will be used to divert the water so as to keep the construction area dry. This will ensure that there is continuous flow of water so that there is no loss of aquatic life both plants and animals as flow will be maintained.		

ASPECT: HYDROLOGICAL		
NATURE OF IMPACT: Inhibiting of the ecological services provided by Vals River.		
Status (positive or negative)	Negative	
	Without Mitigation	With Mitigation
Extent	Regional (3)	Regional (3)
Duration	Short Term (2)	Short Term (2)
Magnitude	High (8)	Medium (6)
Irreplaceable loss of resources?	High (4)	Low (2)
Reversibility	Medium (3)	High (2)
Probability	High (4)	Possible (2)
Significance	Medium-High (80)	Low (30)
Can impacts be mitigated or augmented	Yes	
Mitigation: <ul style="list-style-type: none"> ◇ Maximum riparian vegetation cover must be retained as possible to prevent siltation of the Vals River, therefore clearance must be limited to the construction footprint. ◇ Adequate stormwater and erosion measures must be implemented for the entire assessment area during the construction and operation phase to ensure sufficiently maintained stormwater runoff. ◇ No dumping of rubble or excess building material should take place within the watercourse. ◇ Storage of machinery & surplus materials to be only allowed outside Vals River. ◇ Movement of construction vehicles must be limited to the construction footprint. ◇ The construction footprint through all these portions must also be adequately rehabilitated as soon as practicably possible after construction in order to ensure the continued flow and subsequent ecological functionality and integrity of the Vals River. ◇ A Rehabilitation Management Plan must be developed for this by a suitably qualified and experienced Ecologist. 		
Cumulative impacts: Low		
Residual Impacts: Limited		
Discussion: The contractor must note the Vals River is a sensitive area and ensure that good environmental practise is in place for the duration of the construction and rehabilitation measures implemented immediately when construction activities cease, or it could be done con-currently with the construction activities. On completion of the construction phase and demolition of the coffer dams, the ecological integrity of the river will be retained. Routine inspection of erosion control features must be in place.		

ASPECT: WASTE MANAGEMENT		
NATURE OF IMPACT: Inadequate storage of waste prior to disposal resulting in contamination of the environment.		
Status (positive or negative)	Negative	
	Without Mitigation	With Mitigation
Extent	Local (2)	Footprint (1)
Duration	Short Term (2)	Short Term (2)
Magnitude	High (8)	Very Low (2)
Irreplaceable loss of resources?	High (4)	Very Low (1)
Reversibility	Moderate (3)	High (2)
Probability	High (4)	Possible (2)
Significance	Medium-High (76)	Low (16)
Can impacts be mitigated or augmented	Yes	
Mitigation: <ul style="list-style-type: none"> ◇ Adequate number of refuse bins with lids must be provided. ◇ General waste must be collected daily and stored in refuse bins and disposed weekly or when full at the local registered solid waste site. ◇ Temporary storage site for waste must not be within 100m of Vals River. ◇ No dumping of rubble or excess material must take place within the watercourses. ◇ All visible remains of concrete must be physically removed as soon as possible and disposed to a suitable site and all used cement bags should be properly disposed after use. ◇ Waste management measures must be implemented to prevent litter and debris from entering the watercourse. ◇ No burning or burying of waste is allowed. ◇ Designated eating area should have a refuse bin in the vicinity. ◇ All debris, rubble, and stockpiled materials from the demolition of the storage weir to be used as a coffer dam must be removed from the watercourse. Thereafter, reprofiling of the riverbanks and erosion protection measures. 		
Cumulative impacts: Low		
Residual Impacts: Limited		
Discussion: Waste management is crucial aspect during construction whereby if the site is not kept litter free, then windblown litter may end up in Vals River. Therefore, it is important that suitable and conveniently located refuse bins are provided and there is designated storage area for temporary storage. Cleaning up of the site should be a daily activity, therefore, littering even by the workforce is prohibited. Thus, the contractor must implement the outlined mitigation measures to ensure that the impact can be avoided.		

ASPECT: HEALTH AND SAFETY		
NATURE OF IMPACT: Impact on the health and safety of the workers and neighbouring land users		
Status (positive or negative)	Negative	
	Without Mitigation	With Mitigation
Extent	Local (2)	Local (2)
Duration	Temporary (1)	Temporary (1)
Magnitude	Medium (6)	Low (4)
Irreplaceable loss of resources?	Low (2)	Low (2)
Reversibility	Low (4)	Moderate (3)
Probability	Highly Likely (4)	Possible (1)
Significance	Medium-High (76)	Low (12)
Can impacts be mitigated or augmented	Yes	
Mitigation: <ul style="list-style-type: none"> ◇ The construction site must adhere to the Occupational Health and Safety Act (Act 85 of 1993) including the appointment of a Safety Officer to conduct monthly audits as well as an officer, who is full time on site. ◇ The Contactor must provide employees with suitable equipment to protect them from hazards being presented and that will allow them to work without risk to their health in a hazardous environment, e.g., hard hats, gloves, boots, etc. ◇ An emergency preparedness plan should be compiled and approved by the site engineer and ECO before construction commences. A list of all emergency telephone numbers, i.e., fire, ambulance, safety officer, etc. should be available all the time at the construction site. ◇ A medical first aid kit should be available on site for the duration of the project. ◇ Safety nets/danger tapes must be placed around excavations. ◇ Warning signage must be in place to alert the public of the dangers of undergoing construction activities. ◇ Construction site must be secured against unauthorized access. ◇ No work must be done in the river during high-flows because of the safety risk. 		
Cumulative impacts: None		
Residual Impacts: None		
Discussion: Good construction practices must be in place to ensure the safety of the worker thus not subjecting them to working conditions that are harmful to their health and well-being.		

Operational Phase

ASPECT: SURFACE WATER	
NATURE OF IMPACT: Increase in the upstream water level and changes in the downstream conditions due to the construction of the gauging weir .	
Status (positive or negative)	Negative
These impacts are only realised during the operation phase but can only be mitigated during the design phase. Therefore, it will not be assessed further because the design of the gauging weir will not result in the changes of the current water levels as it is almost the same height as the existing storage weir, which will be demolished. The design criteria is detailed in the Preliminary Design Report and it adheres to the design requirements as set by DWS, therefore impact is negligible.	

ASPECT: SOIL EROSION		
NATURE OF IMPACT: Increased possibility of soil erosion.		
Status (positive or negative)	Negative	
	Without Mitigation	With Mitigation
Extent	Local (2)	Site (2)
Duration	Long Term (4)	Short Term (2)
Magnitude	Medium (8)	Very Low (2)
Irreplaceable loss of resources?	High (4)	Very Low (1)
Reversibility	Moderate (3)	High (2)
Probability	High (4)	Probable (1)
Significance	Medium-High (84)	Low (9)
Can impacts be mitigated or augmented	Yes	
Mitigation:		
<ul style="list-style-type: none"> ◇ ◇ A rip rap protection of the river banks is included in the design. Additional erosion protection measures will also be included in the design against the river banks, on top ,and the floodplain to prevent or minimise erosion damage around the area. Routine inspection of erosion management features for functionality. ◇ All excavations must be filled and rehabilitated before construction moves off site to abate channel and gully formation. 		
Cumulative impacts:		
Limited		

Residual Impacts: Limited
Discussion: Routine inspection of the construction area must be done to ensure that any signs of erosion are attended to. It is important that rehabilitation is done adequately so that there is limited risk of erosion. If any signs of erosion are not attended to, it could cause long lasting if not permanent damage. It is evident that the design of the Crump gauging weir was in a way that impact on the environment is lessened.

No-Go Option

ASPECT: CONTINUED RECORDING OF INACCURATE READINGS AT CH6001 @ROOIWAL STATION		
NATURE OF IMPACT: Release of water at Bloemhof Dam that are no synchronized with the natural flow, negatively affecting downstream users, properties and aquatic life.		
Status (positive or negative)	Negative	
	Without Mitigation	With Mitigation
Extent	Regional (4)	Local (4)
Duration	Permanent (5)	Long term (4)
Magnitude	Very High (10)	Low (4)
Irreplaceable loss of resources?	High (4)	Low (2)
Reversibility	N/A	N/A
Probability	Definite (5)	Possible (2)
Significance	Medium-High (115)	Low (28)
Can impacts be mitigated or augmented	Yes	
Mitigation: ◇ The proposed development of a crump gauging weir must go ahead as planned.		
Cumulative impacts: High		
Residual Impacts: Limited		
Discussion: Should the proposed project not go ahead as planned, the Department of Water and Sanitation will not be able to provide Bloemhof operators with accurate readings to synchronise the release of water from Bloemhof Dam with the Vals and Vaal River. This could negatively impact on downstream users, properties and aquatic life especially during floods.		