ACTIVITY(S)	POTENTIAL ENVIRONMENTAL IMPACT	ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION												RECOMMENDED MITIGATION MEASURES	ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION												Confidence	Irreplaceable loss of resources	Degree of reversibility
		Severity	Spatial Scale	Duration	CONSEQUENCE	Freq of Activity	Freq of Impact	Legal Issues	Detection	LIKELIHOOD	Significance	+/-	RISK RATING		Severity	Spatial Scale	Duration	CONSEQUENCE	Freq of Activity	Freq of Impact	Legal Issues	Detection	LIKELIHOOD	Significance	+/-	RISK RATING			
CONSTRUCTION PHASE																													
Air Quality & Climate																													
Vegetation clearing, topsoil stripping and stockpiling, use of unsurfaced roads and transportation of construction materials	Generation of inhalable particle emissions and fugitive dust and dust fallout	4	2	2	8	5	4	1	3	13	104	-	L	• Reduce speed limit (max 30km/h). • Restrict construction vehicle movement to designated construction areas. • Wet suppression on exposed surfaces, unpaved roads, and materials handling areas-where feasible. • Demarcate and minimise extent of disturbed areas. • Reduction of frequency of disturbance. • Stabilisation (chemical, rock cladding or vegetative) of disturbed and stockpiled soil. • Early/concurrent rehabilitation and re-vegetation, as appropriate on disturbed areas. • Implement dust fallout monitoring.	4	1	2	7	5	4	1	3	13	91	-	L	100%	Low	High
Construction activities involving the use to vehicles and equipment (e.g. generators) and fires	GHG emissions during the construction activities	2	2	2	6	3	3	1	2	9	54	-	L	• Prohibit fires, the burning of waste materials or any debris. • Service and maintain of vehicles, plant and machinery in accordance with a maintenance schedule. • Use high efficiency generators. • Use of low carbon and sulphur fuels. • Equipment that is used intermittently must be switched off when not in use.	2	1	2	5	2	2	1	2	7	35	-	L	100%	Low	Medium
Terrestrial Ecology																													
Vegetation clearing	Loss of vegetation within development footprint	8	3	5	16	5	5	5	2	17	272	-	H	• Limit the impact area and construction activities to the proposed footprint area and the associated infrastructure servitude only. • Existing roads/servitudes should be considered first option over the construction of new roads/servitudes and must only be made where necessary. • Minimise the extent of vegetation clearing for the infrastructure. Areas to be cleared must be clearly/visibly demarcated to avoid unnecessary clearing. • Fire management plan must be in place for the areas surrounding the project area and the road to restrict the impact from fire on the natural flora and fauna communities. • Progressive rehabilitation will enable topsoil to be returned more rapidly, thus ensuring more recruitment from the existing seedbank. Surplus rehabilitation material can be applied to other areas in need of stabilisation and vegetation cover.	6	2	4	12	4	3	5	2	14	168	-	M	75%	High	Low
Introduction of alien species, especially plants	Degradation and loss of surrounding natural vegetation	6	2	3	11	5	5	5	2	17	187	-	M	• Compile and implement an alien vegetation management plan from the onset of construction. The plan must identify areas for action (if any) and prescribe the necessary removal methods and frequencies to be applied. This plan must also prescribe a monitoring plan and be updated as/when new data is collated; • Remove organic waste from site weekly to prevent pest species from becoming a problem. A waste management plan must be compiled and implemented from the onset of the construction phase. The plan must designate collection areas, define the separation of waste and also prescribe removal measures and frequencies from the areas. This plan must be also prescribing a monitoring plan and be updated as/when new data is collated.	6	1	2	9	3	3	5	2	13	117	-	L	75%	Medium	High
Displacement of faunal community due to habitat loss, direct mortalities and disturbance	Construction activity will likely lead to direct mortality of fauna due to earthworks, vehicle collisions, accidental hazardous chemical spills and persecution. Disturbance due to dust and noise pollution and vibration may disrupt behaviour.	6	3	5	14	5	5	1	3	14	196	-	M	• Signs must be put up stating that should any person be found poaching any species they will be fined. • Construction must take place in the winter months as much is feasible. • The areas to be developed must be specifically demarcated to prevent movement of staff or any individual into the surrounding environments, access to these areas must be controlled. Signs must be put up to enforce this. • Speed limits must be implemented on all roads. • Areas should be cleared and disturbed on a needs basis only, as opposed to clearing and disturbing a number of sites simultaneously. • Any holes/deep excavations must done in a progressive manner on a needs basis only. No holes/excavations may be left open overnight. In the event holes/excavations are required to remain open overnight, these areas must be covered to prevent fauna falling into these areas. • Where possible, work should be restricted to one area at a time and be systematic. This is to reduce the number and extent of on-site activities, allowing fauna to move off as the project progresses. This will give the smaller mammals and reptiles a chance to weather the disturbance in an undisturbed zone close to their natural territories. • All personnel and contractors to undergo Environmental Awareness Training. A signed register of attendance must be kept for proof. Discussions are required on sensitive environmental receptors within the project area to inform contractors and site staff of the presence of SCC, their identification, conservation status and importance, biology, habitat requirements and management requirements the Environmental Authorisation and within the EMPr; • Prior to vegetation clearing activities, the area to be cleared should be walked on foot by 1-2 individuals to create a disturbance in order for fauna to move off. Sites should be disturbed only prior to the area having to be cleared, not more than 1 day in advance. • The timing between clearing of an area and subsequent development must be minimized to avoid fauna from re-entering the site to be disturbed.	6	2	2	10	3	3	1	2	9	90	-	L	75%	Medium	Medium
Freshwater Ecology																													
Earthworks & Vegetation clearing	Potential loss of riparian vegetation as a result of the earthworks associated with the construction activities.	6	2	2	10	3	3	5	2	13	130	-	M	The implementation of the proposed 40m buffer around the delineated edges of the wetlands that have been assessed will ensure that no riparian vegetation will be lost during the construction phase. To ensure that the integrity of the buffer is kept the buffer must be clearly demarcated for the duration of the construction phase.	2	1	2	5	1	3	5	2	11	55	-	L	75%	Medium	Medium

The construction will require the clearance of vegetation from the construction site. Uncontrolled stormwater management of the cleared construction areas could result in increased sedimentation of the wetlands.	Potential increase in sedimentation of the wetland features.	6	2	2	10	3	3	5	2	13	130	-	M	A Stormwater Management Plan for the construction phase of the project must be compiled that makes provision for the following: •All areas that are to be cleared for the construction activities must be clearly demarcated before clearance. This is to ensure that the cleared areas are limited to the construction footprint only. •Provision must be made for the capturing of any silt that may wash of the cleared areas. •No stormwater discharge will be allowed to be made directly in any wetland feature from the construction footprint. •If the construction schedule allows, construction should take place during the dry season to limit the potential impact.	2	1	2	5	2	3	5	2	12	60	-	L	75%	Medium	Medium
The presence of plant and equipment on the construction site that make use of petrochemical substances for operation pose a risk of contamination of the water quality in the wetlands.	Contamination of the area by petrochemical spillages	6	2	3	11	3	3	5	2	13	143	-	M	The following management and mitigation measures must be included into the Environmental Management Programme for the project: •All plant and equipment that make use of petrochemical substances must be checked leakages on a daily basis before operations commence. •All plant and equipment that are found to be leaking must be removed from the property and only returned once the leakages have been addressed. •If any petrochemical substances are stored on the property, this storage must be done on an impermeable surface in a bunded area that makes provision for 110% of volume of the substances that are stored. •All refuelling of plant and equipment must be conducted over a drip-tray and will not be allowed to take place within the 40m wetland buffer proposed for the construction phase. •If any plant or equipment is to be parked on the site, these must be parked outside of the 40m wetland buffer proposed for the construction phase •If any spillages from plant or equipment occur, the spill must be immediately contained, the contaminated soils must be collected and bagged in impermeable bags and stored on site to be removed and disposed of by a registered service provider.	2	1	6	9	2	3	5	2	12	108	-	L	75%	Medium	Medium
Spillage or leakage could impact on the water quality that moves through the aquatic features, which could decrease the PES of the features.	Contamination of the aquatic features by the on-site ablution facilities.	6	1	2	9	4	3	5	2	14	126	-	M	The following management measures associated with the ablution facilities must be implemented: •All portable ablution facilities that will be used on site must be located 40m away from the edge of the delineated aquatic feature. If the edge is not clearly defined, this must be done by an aquatic specialist before implementation of the ablutions can take place. •The portable ablution facilities must be provided with sealed wells in which the sewage is collected. •The servicing of these portable ablution facilities must be conducted by a registered service provider who must dispose of the material at a Municipal facility. •A Spill Contingency Plan must be put in place to provide the appropriate management and mitigation measures to be implemented in the event of any spillages from these ablution facilities.	2	1	1	4	2	3	5	2	12	48	-	L	75%	Medium	Medium
Soils, Land Capability and Land Use																														
Construction of CDF	Loss of land capability	8	2	5	15	5	5	1	2	13	195	-	M	• Make use of existing roads or upgraded tracks before new roads are constructed. The number and width of internal access routes must be kept to a minimum; • A stormwater management plan must be implemented for the development. • The areas to be developed must be specifically demarcated to prevent movement of staff or any individual into the surrounding environments, access to these areas must be controlled. Signs must be put up to enforce this; • Stockpiles should be managed; and stripped soils properly demarcated according to their proper layers, especially the topsoil. Also prevent and minimise erosion (e.g., use of embedded geotextiles controls) and contamination from the stockpile; • Rehabilitation of the area must be initiated from the onset of the project. Soil stripped from infrastructure placement can be used for rehabilitation efforts; and • An alien invasive plant species and control programme must be implemented from the onset of the project.	6	2	5	13	5	5	1	2	13	169	-	M	75%	High	Low
Site preparation, including placement of contractor laydown areas and storage (i.e. temporary stockpiles, bunded areas etc.) facilities.	Soil interflow processes: • Infilling of wetlands and watercourses inducing alternative flow paths (if infilling occurs). • Alteration to natural hydropedological flow paths. • Impacts on the macro-soil structure. • Impacts on the hydropedological processes supporting the watercourses. Soil structure & land capability: • Exposure of soils, leading to increased runoff from cleared areas and erosion of the watercourses, thus increasing the potential for sedimentation of the watercourses. • Vegetation loss. • Soil compaction and erosion. Soil quality: • Natural nutrient content decreases due to soil exposure. • Loss of natural bio-organisms essential	6	2	2	10	5	4	1	3	13	130	-	M	• Only excavate areas applicable to the project area. • Backfill the material in the same order it was excavated to reduce contamination of deeper soils with shallow oxidised soils. • Cover excavated soils with a temporary liner to prevent contamination. • Keep the site clean of all general and domestic wastes. All development footprint areas are to remain as small as possible and vegetation clearing is to be limited to what is essential. • Retain as much indigenous vegetation as possible. • Exposed soils are to be protected using a suitable covering or revegetating. • Existing roads should be used as far as practical to gain access to the site, and crossing watercourses in areas where no existing crossing is apparent should be unnecessary, but if it is essential crossings should be made at right angles. • Have emergency fuel & oil spill kits on site. • Soil quality monitoring & visual assessments – monthly basis. If obvious pollution is noted (visually) then it is advised that soil screening be undertaken.	6	1	2	9	5	3	1	3	12	108	-	L	75%	High	Low
Disturbing vadose zone during soil excavations/infilling activities.		8	2	2	12	5	5	1	4	15	180	-	M		6	1	2	9	5	3	1	3	12	108	-	L	75%	High	Low

Vegetation clearing & soil stockpiling.	• Loss of natural bio-organisms essential to soil processes.	8	2	2	12	5	5	1	4	15	180	-	M		6	1	2	9	5	3	1	3	12	108	-	L	75%	High	Low
Seepage/leakages/overland flow from the co-disposal facility and PCDs and oil & fuel spills from vehicles parked at the site	Soil degradation. Compromised soil quality. Prolonged pollution may migrate to the nearby watercourse and/or percolate into the groundwater table	6	2	2	10	5	5	1	1	12	120	-	M	• Routine visual inspections of infrastructure and parking areas for signs of soil contamination. • Have emergency fuel & oil spill kits on site. • Implement spill procedure. Remove hydrocarbon contaminated soil and disposed of as contaminated waste.	2	2	2	6	2	2	1	1	6	36	-	L	75%	Low	High
Temporary dewatering of perched groundwater (only expected during intense storm events and shortly thereafter).	Perched Water Table Dewatering	8	2	2	12	5	5	1	3	14	168	-	M	• Water quality monitoring and routine visual assessment for contamination. • Discharge dewatered / rainwater collected into the nearby stream. If water is contaminated, discharge to the closest greywater system (depending on the extent of contamination).	2	2	2	6	2	2	1	2	7	42	-	L	75%	Low	High
Geohydrological Aspects																														
Site preparation, earthworks and construction	Disturbing vadose zone during soil excavations/construction activities.	6	1	3	10	5	5	1	2	13	130	-	M	• Only clear and excavate areas applicable to the project area. • Backfill the material in the same order it was excavated to reduce contamination of deeper soils with shallow oxidised soils. • Cover excavated soils with a temporary liner to prevent contamination. • Retain as much indigenous vegetation as possible. • Exposed soils are to be protected using a suitable covering or revegetating.	4	1	3	8	3	3	1	2	9	72	-	L	100%	Medium	Medium
Site preparation, earthworks and construction	Poor quality seepage from machinery used to excavate soils. Oil, grease and fuel leaks could lead to hydrocarbon contamination of the vadose zone which could percolate into the shallow aquifer.	6	1	3	10	5	4	1	2	12	120	-	M	• Park heavy machinery in lined areas and place drip trays under vehicles at the site. • Visual soil assessments for signs of contamination during •Provide spillkits and implement Spill Management Procedure.	4	1	3	8	3	3	1	2	9	72	-	L	100%	Medium	Medium
Site preparation, earthworks and construction	Groundwater recharge may increase in some areas and decrease in others	4	2	2	8	3	3	1	3	10	80	-	L	•Appropriate phasing to continue construction soon after clearing activities. • Implement effective stormwater management to prevent ponding. •Continued groundwater monitoring	2	2	2	6	2	2	1	2	7	42	-	L	75%	Low	High
Temporary dewatering of perched groundwater (only expected during intense storm events and shortly thereafter).	Perched Water Table Dewatering	8	2	2	12	5	5	1	3	14	168	-	M	• Water quality monitoring and routine visual assessment for contamination. • Discharge dewatered / rainwater collected into the nearby stream with appropriate erosion protection measures in place. If water is contaminated, discharge to the closest greywater system (depending on the extent of contamination).	2	2	2	6	2	2	1	2	7	42	-	L	75%	Low	High
Hydrological Aspects																														
Site preparation, earthworks and construction	Disturbing vadose zone during soil excavations/activities.	8	2	4	14	5	5	5	3	18	252	-	H	• Only excavate areas applicable to the project area. • Keep the site clean of all general and domestic waste. • All development footprint areas to remain as small as possible and vegetation clearing to be limited to what is essential. • Retain as much indigenous vegetation as possible. • Exposed soils to be protected using a suitable covering. • Existing roads should be used as far as practical to gain access to the site, and crossing the streams in areas where no existing crossing is apparent should be unnecessary, but if it is essential crossings should be made at right angles.	4	2	4	10	5	3	1	3	12	120	-	M	100%	Medium	Medium
Site preparation, earthworks and construction	Surface water contamination and sedimentation from the following activities: • Washing of equipment and vehicles, unattended leaks and spills; • Erosion and sedimentation of watercourses due to unforeseen circumstances (i.e. bad weather); and • Alteration of natural drainage lines which may lead to ponding or increased runoff patterns (i.e. may cause stagnant water levels or increase erosion).	6	2	4	12	3	3	5	2	13	156	-	M	• Install a temporary cut-off trench (if required) to contain poor-quality runoff. • Cover soil stockpiles with a temporary liner to prevent contamination (where required and visually determined). • Access roads should have run-off control features to redirect water flow and dissipate any energy in the water, which may pose an erosion risk. • Washing of vehicles or machinery must be limited to designated areas within the dirty water catchment. • Park vehicles in designated areas. • Park heavy machinery in lined areas and place drip trays under vehicles at the site. • Visual soil assessments for signs of contamination during construction (monthly) • Provide spillkits and implement spill management procedures.	4	2	4	10	2	2	5	2	11	110	-	L	100%	Medium	Medium
Temporary dewatering of perched groundwater (only expected during intense storm events and shortly thereafter).	Perched Water Table Dewatering	4	1	2	7	5	3	1	2	11	77	-	L	• Water quality monitoring and routine visual assessment for contamination. • Discharge dewatered / rainwater collected into the nearby stream. May require authorisation. If water is contaminated, discharge to the closest greywater system (depending on the extent of contamination)	2	1	2	5	5	3	1	2	11	55	-	L	100%	Low	High
Visual Impacts																														
Transformation of the landscape by site preparation, earthworks and general construction activities	Negative visual impact on aesthetics	6	2	3	11	4	4	1	2	11	121	-	M	• Limit the construction footprint. • No vegetation clearing must take place beyond the development footprint. • All disturbed areas should be rehabilitated after the construction phase. • Limit construction activities to standard working hours. •Minimize construction duration. • Restrict the movement of personnel and construction vehicles to where they are needed. • Ensure that unwanted construction material is stored in the correct manner and out of sight of surrounding receptors. • Dispose of all unwanted construction material and waste at an appropriately licensed waste facility.	4	2	2	8	2	2	1	2	7	56	-	L	75%	Low	High

Site preparation, earthworks and general construction activities	Poor visibility due to dust creation	6	1	2	9	4	4	5	2	15	135	-	M	•Minimize construction duration. • Restrict the movement of personnel and construction vehicles to where they are needed. •Implement and enforce strict speed limits. •Dust suppression measures to be implemented. •Schedule construction as soon after vegetation removal as possible to reduce the amount of time over which surfaces are exposed. • All disturbed areas should be rehabilitated after the construction phase	2	1	2	5	2	2	5	2	11	55	-	L	75%	Low	High
Security and night time lighting	Visual intrusion due to glare, light trespass and skyglow	6	2	2	10	4	5	1	1	11	110	-	L	• Choose suitable types of lighting that minimize glare and sky glow • Only focus light sources on where it is needed and utilize motion sensor lights where possible. • Consult a qualified lighting engineer or lighting specialist, should it be required. • No spotlights should be used, if possible.	2	1	2	5	2	2	1	1	6	30	-	L	75%	Low	High
Noise Impacts																															
Site preparation, earthworks and construction	Noise disturbance to sensitive receptors	4	2	2	8	4	3	5	2	14	112	-	L	• Limit construction activities to standard working hours. • Ensure all equipment and vehicles are regularly serviced. • Equipment and machinery used must comply with manufacturer's specifications and should not exceed regulated limits.. • Ensure a complaints register is available on site and that all noise complaints are addressed. • Strict adherence to the Construction EMP. • Constant monitoring and appointment of an ECO. • Implement a noise monitoring programme.	2	2	2	6	4	3	5	2	14	84	-	L	100%	Low	High
Heritage & Paleontological Impacts																															
• Site clearing • Excavations • Movement of construction vehicles and machinery • Construction and Edge Construction Activities • Human disturbance	• Loss of / damage to heritage/archaeological resources • Loss of /damage to palaeontological resources	4	1	5	10	2	2	5	2	11	110	-	L	• Implement a Chance Find Protocol during construction • Demarcate footprint areas clearly & ensure site clearance remain within the footprint area only • Restrict movement of construction employees outside of construction areas • Restrict vehicles to travelling only on designated roadways • Strict adherence to the Construction EMP • Constant monitoring and appointment of an ECO • In the event that any sub-surface paleontologically or cultural heritage resources or graves are unearthed during construction process all work has to be stopped until the site has been inspected and mitigated by an appropriately qualified practitioner with the necessary archaeological/paleontological background	2	1	5	8	1	1	5	2	9	72	-	L	100%	Low	High
Traffic Impacts																															
Construction activities	Increase in traffic volumes and road incidents due to construction vehicles and construction personnel travelling to the site	6	3	2	11	2	4	5	3	14	154	-	M	• Adhere to work schedule which limits construction to day time as far as possible. • Maintain complaints register. Investigate complaints and keep a record of the investigation undertaken and results thereof and provide feedback to the complainant. • Construction and delivery vehicles will be required to adhere to all traffic rules with penalties imposed for non-compliance. • Construction and delivery vehicles are to use approved routes. • All drivers must undergo induction and be required to have a valid driver's licence	4	3	2	9	2	2	5	2	11	99	-	L	75%	Medium	Medium
Socio-Economic Impacts																															
Construction activities	Temporary job creation and skills development	6	2	2	10	4	4	1	2	11	110	+	L	• Ensure that contractors procure local labour, where possible, in accordance with Kangra's applicable policies and commitments. • Maintain the open and transparent recruitment procedures that are disclosed to community members • Use various mechanisms to advertise employment opportunities before commencement of construction • Provide or facilitate training of local people, such as through internships, scholarships, and/or vocational and skills training programmes	6	2	2	10	4	4	1	2	11	110	+	L	75%	Low	High
Construction activities	Increase in nuisance factors: • Dust & noise could increase as a result of an increase in traffic • General construction activities resulting in an increase in fugitive dust emissions	6	3	2	11	2	4	5	3	14	154	-	M	• Implement recommended mitigation measures for the reduction of dust generation and the suppression of dust. • Implement recommended mitigation measures for the reduction of noise. • Adhere to work schedule which limits construction to day time as far as possible. • Monitor air quality and noise levels • Maintain complaints register. Investigate complaints and keep a record of the investigation undertaken and results thereof and provide feedback to the complainant.	4	3	2	9	2	2	5	2	11	99	-	L	75%	Medium	Medium

ACTIVITY(S)	POTENTIAL ENVIRONMENTAL IMPACT	ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION												RECOMMENDED MITIGATION MEASURES	ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION												Confidence	Irreplaceable loss of resources	Degree of reversibility
		Severity	Spatial Scale	Duration	CONSEQUENCE	Freq of Activity	Freq of Impact	Legal Issues	Detection	LIKELIHOOD	Significance	+/-	RISK RATING		Severity	Spatial Scale	Duration	CONSEQUENCE	Freq of Activity	Freq of Impact	Legal Issues	Detection	LIKELIHOOD	Significance	+/-	RISK RATING			
OPERATIONAL PHASE																														
Air Quality & Climate																														
Use of haul roads and generation of wind-borne dust from the CDF	Generation of inhalable particle emissions and fugitive dust	8	2	4	14	5	5	1	3	14	196	-	M	• Concurrent rehabilitation of the CDF(capping, application of topsoil and planting of grass cover). • Rehabilitate exposed areas and monitor the progress thereof. • Wet suppression of haul roads. • Continuation of current dust fallout monitoring to . • Maintaining and manage a Complaints Register.	4	1	4	9	5	3	1	3	12	108	-	L	100%	Low	High
Terrestrial Ecology																														
Continued fragmentation and degradation of habitats and ecosystems	Disturbance created during the construction phase will leave the project area vulnerable to erosion and invasive plant encroachment.	6	3	3	12	5	4	5	2	16	192	-	M	• It should be made an offence for any staff to /take bring any plant species into/out of any portion of the project area. No plant species whether indigenous or exotic should be brought into/taken from the project area, to prevent the spread of exotic or invasive species or the illegal collection of plants. • Implementation of an alien vegetation management plan. • The area must be demarcated and no disturbance is to be allowed outside the direct development footprint.	6	2	2	10	3	2	5	1	11	110	-	L	75%	Medium	High
Proximity of infrastructure and human activity to the wetlands	This may lead to local disturbance of fauna and flora, through noise, light, trampling, etc. Fauna may move away from the site.	6	3	4	13	5	4	1	2	12	156	-	M	• Lighting should face away from the wetlands. • Workers should be discouraged from walking on the bed and banks of the wetlands.	6	2	3	11	4	3	1	1	9	99	-	L	75%	Medium	High
Spread of alien and/or invasive species	Ongoing displacement and direct mortalities of faunal community due to disturbance	6	2	2	10	5	4	5	2	16	160	-	M	• Lighting should be kept to a minimum to avoid disturbing crepuscular and nocturnal species. Lighting fixtures should be fitted with baffles, hoods or louvres and directed downward, to minimize light pollution which could attract night migrating species. • Lighting should be directed towards to footprint area and avoid unnecessary illumination of the adjacent undeveloped areas. • Where feasible, motion detection lighting must be used to minimise the unnecessary illumination of areas • Avoid using any road during the night; • Fences must have 30 x 30 cm holes in at the bottom at every 250m to allow for free movement of fauna.	6	1	1	8	4	3	5	2	14	112	-	L	75%	High	Medium
Freshwater ecology																														
Any leakages of untreated effluent from the WWTW will result in the contamination of the water in the wetland features which will impact on the PES of the features.	Contamination of leakage of untreated effluent from the WWTW	8	2	2	12	3	5	5	3	16	192	-	M	The Operational Management Plan of the WWTW must make provision for regular monitoring of the works to ensure that there are no leakages from the plant. The design of the WWTW must make provision for the discharge of any overflow effluent into the associated PCDs to ensure that the no untreated effluent is released from the works area. No untreated effluent will be allowed to be discharge from the WWTW. The Operational Management Plan should also make provision for the actions that must be taken in the event of an accidental spill form the works area. These should make provision for: •Containment of the leakage; •Collection of the effluent and possible contaminated soils; •Storage of the contained material; and •Removal and disposal from the site by registered service provider.	8	1	2	4	1	3	5	3	12	48	-	L	75%	Medium	Medium
Any leakages of untreated effluent from the pipe networks supplying untreated effluent to the WWTW will result in the contamination of the water in the wetland features which will impact on the PES of the features.	Contamination of leakages of untreated effluent from the pipeline network.	8	2	2	12	3	4	5	3	15	180	-	M	The Operational Management Plan of the WWTW must make provision for regular monitoring of the pipework that deliver effluent to ensure that there are no leakages from the pipelines. The Operational Management Plan should also make provision for the actions that must be taken in the event of an accidental spill form the pipelines. These should make provision for: •Containment of the leakage; •Collection of the effluent and possible contaminated soils; •Storage of the contained material; and •Removal and disposal from the site by registered service provider.	8	1	2	11	2	3	5	3	13	143	-	M	75%	Medium	Medium
Any leakages of treated effluent from the discharge pipeline may result in additional water entering the wetland features associated with the project. This additional water moving into the wetlands may impact the PES of the features.	Changes to the hydrological regime of the wetlands due to leakages from the treated discharge pipeline.	4	2	2	8	3	4	5	3	15	120	-	M	The Operational Management Plan of the WWTW must make provision for regular monitoring of the treated effluent discharge pipeline for any leakages. The Operational Management Plan should also make provision for the actions that must be taken in the event of any leakages from the pipeline. These should make provision for: •Stopping the treated effluent discharge; and •Immediately addressing the leak from the pipeline.	4	2	2	8	1	3	5	3	12	96	-	L	75%	Medium	Medium
The discharge of treated effluent is directly into the Heyshope Dam. Any changes in the quality of the treated effluent may impact on the water quality in the dam.	Pollution of the Heyshope Dam due to treated effluent discharge limits not being met by the WWTW.	8	2	3	13	3	4	5	3	15	195	-	M	The Operational Management Plan of the WWTW must make provision for regular treated effluent quality monitoring to take place to ensure that the treated effluent remains in the discharge limits that will be stipulated in the Water Use Licence for the discharge. If the discharge limits cannot be met, the discharge should be ceased up until such time as the limits associated with the licence can be produced.	4	2	2	8	1	3	5	3	12	96	-	L	75%	Medium	Medium
Soils, Land Capability and Land Use																														
Disturbing the inner-soil architecture of the original soil profile will disturb natural flow processes (i.e. a result of infilling or cut-and-fill activities). Excavated soil will be placed in other areas (i.e. on top of other soils) and will have an impact on the flow dynamics of the soil it is dumped on top of. This may reduce rainfall infiltration and induce runoff. Impermeable areas will decrease rainfall infiltration into soils, and hence reduce interflow (A/B and A/bedrock) or lateral flow to downstream wetland areas.	Soil interflow processes: • Alteration to natural hydropedological flow paths. • Impacts on the macro-soil structure. • Impacts on the hydropedological processes supporting the watercourses.	6	2	4	12	5	4	1	3	13	156	-	M	• Revegetate areas (with vegetation growing at the site) where heavy machinery movement takes place to prevent erosion. • Ensure that clean stormwater is attenuated back to the natural environment, directly downstream of the development. The release of stormwater will offset the rainfall infiltration reduction impacts on soil interflow and may benefit downstream watercourses and wetland units.	6	2	4	12	5	4	1	3	13	156	+	M	75%	Low	High
Seepage/leakages/overland flow from the CDF and oil spills and leaks from vehicles and machinery	Soil contamination	2	2	3	7	5	4	1	3	13	91	-	L	• Have emergency fuel & oil spill kits on site. • Implement Spill Management Procedure. Remove hydrocarbon contaminated soil and disposed of as contaminated waste. • Ensure PCDs are operated with the required freeboard stipulated in the Water Use Licence.	2	2	3	7	2	2	1	3	8	56	-	L	75%	Low	High
Geohydrological Aspects																														

Seepage from the PCDs due to liner failure or overflows	Deterioration of groundwater quality	8	3	5	16	4	4	5	3	16	256	-	H	•Regular inspections of the liner. •Continued groundwater monitoring to detect potential seepage •Maintenance of the required freeboard.	2	2	4	8	3	2	5	3	13	104	-	L	100%	Low	High
Seepage from the CDF due to failure of liner or drainage system	Deterioration of groundwater quality	10	3	4	17	4	4	5	3	16	272	-	H	• Water quality monitoring and visual assessments. • Routine inspections of all stormwater systems. • Inspect and maintain the liner and drainage system. • Ensure slopes are shaped to prevent erosion. • Undertake concurrent rehabilitation to reduce the infiltration of rainwater.	2	2	4	8	3	2	5	3	13	104	-	L	100%	Low	High
Use liners and compaction of surfaces	Reduction to groundwater recharge over project area	2	2	4	8	4	4	1	2	11	88	-	L	No mitigation is possible. Liners are required to prevent groundwater contamination.	2	2	4	8	4	4	1	2	11	88	-	L	100%	Low	High
Hydrological Aspects																															
Seepage from the CDF, PCDs and Brine PCD • Poor quality seepage and runoff from vehicles parked at the site.	Contamination of vadose zone soils	6	2	4	12	4	3	5	3	15	180	-	M	• Keep the site clean of all general and domestic waste. • Water quality of the streams and sewer line monitoring. • Soil covers in areas where erosion is noted, and dust suppression of the landfill to prevent dust migration onto soils.	4	2	4	10	2	2	1	3	8	80	-	L	100%	Medium	High
Stormwater runoff from WWTP and co-disposal facility • Potential surface water contamination as a result of poor stormwater drainage on-site. • Increased erosion due to vegetation loss. • Contaminated runoff water into nearby streams from parked vehicles or overflow from PCDs. • Sedimentation of watercourses due to altered runoff patterns.	Contamination of surface water	10	2	4	16	5	4	5	2	16	256	-	H	• Implement appropriate approved stormwater management system. • Routine hydraulic monitoring of the stormwater system (monthly). • Rehabilitate exposed surfaces and monitor until vegetation establishment is successful. • Maintain sufficient freeboard in PCDs in accordance with the WUL requirements. • Commission Brine Treatment Plant to reduce the volume of brine in the Brine PCD. • Operate WWTP and Brine Treatment Plant in accordance with Standard Operating Procedures. •Prohibit movement or parking of vehicles outside of dirty water catchment. • Water quality monitoring and visual assessments.	2	2	4	8	4	3	5	2	14	112	-	L	100%	Medium	High
Seepage from the CDF	Poor quality seepage into the subsoils from landfill may impact soil quality, and eventually lead to poor quality seepage into the surroundings.	10	2	4	16	5	4	5	2	16	256	-	H	• Water quality monitoring and visual assessments. • Routine inspections of all stormwater systems. • Ensure the facility is lined. • Ensure slopes are shaped to prevent erosion. • Undertake concurrent rehabilitation to reduce the infiltration of rainwater.	4	2	4	10	5	3	5	2	15	150	-	M	100%	Medium	High
Treatment of decanting water into Heyshope Dam	Reduction of contamination surface water resource	10	2	4	16	5	4	5	2	16	256	+	H	Positive impact. No mitigation required.	10	2	4	16	5	4	5	2	16	256	+	H	100%	Low	High
Visual Impacts																															
Visual impact of the CDF	Increasing size of CDF over the life of the facility	4	2	5	11	5	4	1	2	12	132	-	M	• CDF rise to be undertaken in accordance with design and to be overseen by engineer. • Compile and implement concurrent rehabilitation plan. • Use suitable building finishes/colours that blend in with the surrounding landscape	2	2	5	9	5	4	1	2	12	108	-	L	75%	Low	High
Wind-borne dust from CDF, haul roads and exposed areas.	Poor visibility conditions	2	2	4	8	4	4	1	2	11	88	-	L	•Rehabilitate exposed areas and monitor until vegetation establishment is successful. •Undertake concurrent rehabilitation of the CDF. •Wet suppression of haul roads.	0	1	4	5	2	2	1	1	6	30	-	L	75%	Low	High
Security and night time lighting	Visual intrusion due to glare, light trespass and skyglow	4	2	4	10	4	4	1	2	11	110	-	L	• Choose suitable types of lighting that minimize glare and sky glow • Only focus light sources on where it is needed • Consult a qualified lighting engineer or lighting specialist • No spotlights should be used, if possible	2	1	4	7	2	2	1	1	6	42	-	L	75%	Low	High
Noise Impacts																															
Operational activities	Noise disturbance to sensitive receptors	4	2	4	10	4	4	5	1	14	140	-	M	• Limit activities to standard working hours. • Ensure all equipment and vehicles are regularly serviced. • Equipment and machinery used must comply with manufacturer's specifications and should not exceed regulated limits. • Ensure a complaints register is available on site and that all noise complaints are investigated and addressed. • Implement a noise monitoring programme.	2	2	4	8	3	3	5	1	12	96	-	L	75%	Low	High
Socio-Economic Impacts																															
Maintenance of long term employment	Continued mining facilitated by the provision of a CDF for the disposal of mine wastes.	8	2	5	15	5	5	1	2	13	195	+	M	•Source labour where possible from the surrounding local community in accordance with Kangra's applicable commitments and policies. •Grant skills development opportunities to community members and local job seekers, where needed. •Capture all project relevant skills in the project area with the aim to ensure maximum local employment.	8	2	5	15	5	5	1	2	13	195	+	M	75%	Low	High
• Operational activities	• Traffic volumes are anticipated to remain the same • Dust and noise as a result of general operational activities	6	3	4	13	3	3	5	3	14	182	-	M	• Implement recommended mitigation measures for the reduction of dust generation and the suppression of dust. • Implement recommended mitigation measures for the reduction of noise. • Adhere to work schedule which limits activities to day time as far as possible. • Monitor air quality and noise levels • Maintain complaints register. Investigate complaints and keep a record of the investigation undertaken and results thereof and provide feedback to the complainant.	4	2	4	10	3	3	1	3	10	100	-	L	75%	Low	Medium

ACTIVITY(S)	POTENTIAL ENVIRONMENTAL IMPACT	ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION												RECOMMENDED MITIGATION MEASURES	ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION												Confidence	Irreplaceable loss of resources	Degree of reversibility
		Severity	Spatial Scale	Duration	CONSEQUENCE	Freq of Activity	Freq of Impact	Legal Issues	Detection	LIKELIHOOD	Significance	+/-	RISK RATING		Severity	Spatial Scale	Duration	CONSEQUENCE	Freq of Activity	Freq of Impact	Legal Issues	Detection	LIKELIHOOD	Significance	+/-	RISK RATING			
DECOMMISSIONING PHASE																													
Air Quality & Climate																													
Transport, demolition activities and ripping of compacted areas	Generation of inhalable particle emissions and fugitive dust and dust fallout	4	2	2	8	5	4	1	3	13	104	-	L	• Reduce speed limit (max 30km/h). • Restrict construction vehicle movement to designated areas. • Wet suppression on exposed surfaces, unpaved roads. • Limit activities to the designated footprint area. • Reduction of frequency of disturbance. • Begin rehabilitation and re-vegetation of disturbed areas as soon as possible. • Continue dust fallout monitoring.	4	1	2	7	5	4	1	3	13	91	-	L	100%	Low	High
Transport, demolition activities and ripping of compacted areas	GHG emissions during the demolition activities	2	2	2	6	3	3	1	2	9	54	-	L	• Prohibit fires, the burning of waste materials or any debris. • Service and maintain of vehicles, plant and machinery in accordance with a maintenance schedule. • Use high efficiency generators. • Use of low carbon and sulphur fuels. • Equipment that is used intermittently must be switched off when not in use.	2	1	2	5	2	2	1	2	7	35	-	L	100%	Low	Medium
Terrestrial Ecology																													
Movement of vehicles, machinery and personnel and potential damage to vegetation	Potential loss of indigenous vegetation units	4	1	4	9	3	3	5	1	12	108	-	L	• Demarcate working footprint area clearly. • Restrict site clearance to the footprint area only. • Edge effects of decommissioning activities need to be actively managed. • Vegetation outside of the designated footprint area must be left undisturbed. • Restrict the movement of personnel and vehicles to where they are needed within designated areas only. • Upon completion of decommissioning activities, it must be ensured that all bare areas are revegetated and that no bare areas remain. • Strict adherence to the decommissioning EMP. • Constant monitoring through the appointed EC.	2	1	4	7	3	3	5	1	12	84	-	L	75%	Low	Medium
• Disturbance of vegetation • Movement of vehicles, machinery and personnel • Dumping of material outside of designated areas	Potential increase in alien vegetation	6	2	3	11	4	3	5	2	14	154	-	M	• Edge effects of decommissioning activities need to be actively managed. • Restrict the movement of personnel and vehicles to where they are needed within designated areas only. • Ensure the continued implementation of an Alien Invasive Species Management Plan which must make provision for the following: - Identification of the alien invasive species that have settled on the site; - Clear instructions on how to eradicate these species; - A schedule of eradication; and - A schedule of regular monitoring of the success of the implementation of the eradication. • Strict adherence to the decommissioning EMP. • Constant monitoring through the appointed EC.	2	1	3	6	4	3	5	1	13	78	-	L	75%	Low	High
• Generation of waste and refuse during the execution of decommissioning activities on the site	Contamination of the area by demolition and domestic waste	4	1	2	7	4	3	5	2	14	98	-	L	• Skips must be made available on-site for demolition waste disposal. • All demolition waste must be cleared from the site on a daily basis and placed in these skips. • The capacity of these skips must be monitored daily and skips must be emptied/replaced when required to prevent overflows. • The disposal of the content of these skips must be done at an appropriately licensed municipal landfill site. • Dumping or burials of demolition waste within the project site or in the surrounding areas will be strictly prohibited. • Strict adherence to the decommissioning EMP. • Constant monitoring through the appointed ECO. • Implement a waste management plan and monitor levels of litter constantly. • A designated eating area must be established within the contractor site. • Covered domestic waste bins must be present at the eating area to receive all the domestic waste generated. • The capacity of these domestic waste bins must be monitored on a daily basis to ensure that they are emptied timeously. • The domestic waste from these waste bins must be removed off site and disposed of at an appropriately licensed municipal landfill site on a weekly basis or more regularly if the bins fill up quicker.	2	1	1	4	4	3	5	2	14	56	-	L	75%	Low	High
Movement of vehicles	Direct mortality of fauna Disturbance due to dust and noise pollution and vibration may disrupt behaviour.	6	2	2	10	3	3	1	2	9	90	-	L	• Signs must be put up stating that should any person be found poaching any species they will be fined. • Speed limits must be implemented on all roads. • All personnel and contractors to undergo Environmental Awareness Training. A signed register of attendance must be kept for proof. Discussions are required on sensitive environmental receptors within the project area to inform contractors and site staff of the presence of species of conservation concern (SCC), their identification, conservation status and importance, biology, habitat requirements and management requirements the Environmental Authorisation and within the EMPr; • As far a reasonably practicable avoid using full beam headlights to minimise light pollution to as it may distract animals and increase the chances of road kill.	2	2	2	6	3	3	1	2	9	54	-	L	75%	Low	High
Freshwater Ecology																													
• Removal of surface infrastructure • Rehabilitation activities	Positive effect on aquatic resources due to removal of surface infrastructure and rehabilitation of the area	6	1	4	11	4	3	5	3	15	165	+	M	• Ensure adequate stormwater management measures are implemented to prevent potential soil erosion and sedimentation. • Ongoing monitoring.	6	1	4	11	4	3	5	3	15	165	+	M	75%	Medium	High

Seepage/leakages/overland flow from the CDF and PCDs	Soil degradation. Compromised soil quality. Prolonged pollution may migrate to the nearby watercourse and/or percolate into the groundwater table	6	2	2	10	5	5	1	1	12	120	-	M	• Final rehabilitation of the CDF and monitoring thereof until vegetation establishment is successful. •Rehabilitation of disturbed areas monitoring thereof until vegetation establishment is successful. • Continue drainage and collection of polluted seepage water. • Implement silt interception such as the placement of silt nets where necessary. • Continue drainage and collection of polluted seepage water. Rehabilitate PCD during closure if area is considered non-polluting	2	2	2	6	2	2	1	1	6	36	-	L	75%	Low	High
• Damage to vegetation • Edge effect • Movement of vehicles, machinery and personnel	Negative effect on aquatic resources due to water quality deterioration as a result of erosion and sedimentation, and/or inadequate stormwater management	6	2	4	12	5	5	5	1	16	192	-	M	• Ensure adequate stormwater management measures are implemented to prevent potential soil erosion and sedimentation. • Demarcate footprint area clearly & minimise site clearance. • Edge effects of demolition activities need to be actively managed. • Vegetation outside of the designated footprint area must be left undisturbed. • Restrict the movement of personnel and vehicles to where they are needed. • Upon completion of decommissioning activities, it must be ensured that no bare areas remain. • Strict adherence to the Decommissioning EMP. • Ongoing monitoring.	2	1	4	7	5	5	5	1	16	112	-	L	75%	Medium	Medium
• Storage of hazardous waste and substances • Generation and storage of general waste	Negative effect on aquatic resources due to water quality deterioration as a result of contamination of the area by hydrocarbon/chemical spillages and/or dumping of material outside of designated areas	8	2	2	12	5	4	5	2	16	192	-	M	• Maintain 40m buffer zone around the aquatic systems during decommissioning. • Surface water monitoring must continue. • No cleaning of vehicles, machines and equipment on site. • All hazardous substances to be stored separately in appropriately bunded and demarcated facilities • Provide spill kits and implement Spill Procedure • Rehabilitate disturbed areas as soon as possible to prevent erosion • Implementation of waste management plan. • Ablution facilities may not be placed within 50 m or the 1:50 year floodline. Whichever is furthest will apply. Appropriate sanitary facilities must be provided and all waste to be removed to an appropriate waste facility • Suitable waste receptacles must be positioned throughout the site and should be wind and scavenger proof." "• Restrict movement of construction vehicles to designated areas and roadways. • All plant and equipment must be checked leakages on a daily basis and removed for repairs if leaking. • Maintenance to be done in suitably designed areas, preferably off site. • All refuelling must be conducted over a drip-tray or designated bunded areas. • Ensure that no material is dumped outside of the designated areas.	4	1	2	7	3	3	5	1	12	84	-	L	75%	Medium	Medium
Soils, Land Capability and Land Use																													
Decommissioning of non-essential infrastructure to rehabilitate and close the co-disposal facilities, and rehabilitate the PCD areas.	Soil interflow processes: • Infilling of wetlands and watercourses inducing alternative flow paths (if infilling occurs). • Alteration to natural hydropedological flow paths. • Impacts on the macro-soil structure. • Impacts on the hydropedological processes supporting the watercourses. Soil structure & land capability: • Exposure of soils, leading to increased runoff from cleared areas and erosion of the watercourses, thus increasing the potential for sedimentation of the watercourses. • Vegetation loss. • Soil compaction; and Soil erosion. Soil quality: • Natural nutrient content decreases due to soil exposure. • Loss of natural bio-organisms essential to soil processes.	6	2	4	12	5	5	5	3	18	216	+	M	No mitigation is required. Rehabilitation will likely improve the impact of the development on the hydropedology assessment. General risks associated with the construction phase will likely exist during earthworks and rehabilitation activities. • Only excavate areas applicable to the project area. • Backfill the material in the same order it was excavated to reduce contamination of deeper soils with shallow oxidised soils. • Keep the site clean of all general and domestic wastes. All development footprint areas are to remain as small as possible and vegetation clearing is to be limited to what is essential. • Retain as much indigenous vegetation as possible. • Exposed soils are to be protected using a suitable covering or revegetating. • Existing roads should be used to gain access to the site. No new roads should be created. • Have emergency fuel & oil spill kits on site and implement Spill Management Procedure. • Soil quality monitoring & visual assessments - monthly basis. If obvious pollution is noted (visually) then it is advised that soil screening be undertaken.	6	2	4	12	5	5	5	3	18	216	+	M	75%	Low	High
Re-Disturbing vadose zone during soil excavations/infilling activities.		6	2	4	12	5	5	5	3	18	216	+	M		6	2	4	12	5	5	5	3	18	216	+	M	75%	Low	High
Re-vegetation and rehabilitation.		6	2	4	12	5	5	5	3	18	216	+	M		6	2	4	12	5	5	5	3	18	216	+	M	75%	Low	High
The presence of the CDF will have long-term implications in terms of altering the natural hydropedological flow drivers of the subsoils, on which the facility is situated This applies to the proposed PCDs as well.	Soil interflow processes: • Alteration to natural hydropedological flow paths. • Impacts on the macro-soil structure. • Impacts on the hydropedological processes supporting the watercourses.	6	2	4	12	5	4	1	3	13	156	-	M	• Revegetate areas (with vegetation growing at the site) where heavy machinery movement takes place to prevent erosion. • Ensure that clean stormwater is attenuated back to the natural environment, directly downstream of the development. The release of stormwater will offset the rainfall infiltration reduction impacts on soil interflow and may benefit downstream watercourses and wetland units.	6	2	4	12	5	4	1	3	13	156	+	M	75%	Low	Medium

Operation and maintenance of vehicles and machinery resulting in spills or leaks	Contamination of the area by petrochemical spillages	4	1	2	7	4	4	5	2	15	105	-	L	• All plant and equipment that make use of petrochemical substances must be checked leakages on a daily basis before operations commence. • All plant and equipment that are found to be leaking must be removed from the property and only returned once the leakages have been addressed. • If any petrochemical substances are stored on the property, this storage must be done on an impermeable surface in a bunded area that makes provision for 110% of volume of the substances that are stored. • All refuelling of plant and equipment must be conducted over a drip-tray or designated bunded areas. • If any plant or equipment is to be parked on the site, these must be parked within the demarcated footprint that has been cleared. • If any spillages from plant or equipment occur, the spill must be immediately contained, the contaminated soils must be collected and bagged in impermeable bags and stored on site to be removed and disposed of by a registered service provider.	2	1	2	5	4	3	5	2	14	70	-	L	75%	Medium	Medium
• Loss of topsoil due to decommissioning activities • Increased stormwater run-off due to increased compacted areas • Increased vehicular movement	Soil loss / Soil erosion	6	1	2	9	5	4	5	1	15	135	-	M	• Ripping and reinstatement of soil should not be done earlier than required. • Plan drainage paths and soil conservation measure to prevent soil erosion . • Where possible, sandbags (or similar) must be placed at the bases of any stockpiled material to prevent erosion of the material. • Appropriate erosion protection measures must be implemented at stockpiles. • Stabilise and rehabilitate exposed areas as soon as possible.	4	1	2	7	3	3	5	1	12	84	-	L	75%	Medium	Medium
Geohydrological Aspects																														
Operation and maintenance of vehicles and machinery resulting in spills or leaks	Poor quality seepage from machinery. Oil, grease and fuel leaks could lead to hydrocarbon contamination of the vadose zone which could percolate into the shallow aquifer.	6	1	3	10	5	4	1	2	12	120	-	M	• Park heavy machinery in lined areas and place drip trays under vehicles at the site. • Visual soil assessments for signs of contamination during decommissioning •Provide spillkits and implement Spill Management Procedure.	4	1	3	8	3	3	1	2	9	72	-	L	100%	Medium	Medium
Final rehabilitation of CDF	Reduced volumes infiltrating the CDF reporting to PCD	4	2	5	11	4	4	5	3	16	176	+	M	No mitigation proposed.	4	2	5	11	4	4	5	3	16	176	+	M	100%	Low	High
Hydrological Aspects																														
Disturbing vadose zone during rehabilitation actions associated with the landfill (co-disposal facility).	The reshaping and rehabilitation of the co-disposal facility will be beneficial to the environment. Capping and reducing infiltration into the dump will help mitigate any poor-quality seepage.	6	2	4	12	3	3	5	3	14	168	+	M	• Only excavate areas applicable to the project area. • Keep the site clean of all general and domestic waste. • Revegetate the co-disposal facility. • Cover the co-disposal facility with a suitable impermeable capping layer or compact t reduce recharge into the landfill.	10	2	4	16	5	5	5	3	18	288	+	H	100%	Low	High
Seepage from the co-disposal facility	Poor quality seepage into the subsoils from landfill may impact soil quality, and eventually lead to poor quality seepage into the surroundings.	2	1	4	7	2	2	5	2	11	77	-	L	• After rehabilitation takes place, there should be limited seepage from the dump. • Routine inspections and water quality monitoring of the boreholes and surface water streams downstream of the site (quarterly) should be sufficient to determine closure objectives.	2	1	4	7	2	2	5	2	11	77	-	L	100%	Low	High
Stormwater runoff from WWTP, PCDs and CDF during decommissioning	• Potential surface water contamination as a result of poor stormwater drainage on-site. • Increased erosion due to vegetation loss. • Contaminated runoff water into nearby streams from parked vehicles or unattended leaks or spills. • Sedimentation of watercourses due to altered runoff patterns.	2	1	4	7	2	2	5	2	11	77	-	L	• Provide spillkits and implement spill management procedure. • Limit activities and parking of vehicles to designated footprint areas. • Rehabilitate areas as soon as possible and monitor progress. • After rehabilitation takes place, there should be limited seepage from the dump. • Maintain stormwater measures until runoff water is no longer contributing to surface water contamination. • Routine inspections and water quality monitoring of the boreholes and surface water streams downstream of the site (quarterly) should be sufficient to determine closure objectives. • Routine hydraulic monitoring of the stormwater system (monthly)	2	1	4	7	2	2	5	2	11	77	-	L	100%	Low	High
Overflow from PCD during storm events	Overflow from PCD and TSF during storm events	6	2	2	10	5	4	1	2	12	120	-	M	• Rehabilitate PCD if no longer required during the closure phase.	2	2	4	8	4	3	5	2	14	112	-	L	100%	Medium	Medium
Visual Impacts																														
Removal of surface infrastructure Rehabilitation of disturbed areas	Positive visual impact on aesthetics	4	2	2	8	5	5	1	2	13	104	+	L	•Monitor rehabilitated areas to ensure that rehabilitation has been effective. •Implement further rehabilitation measures where rehabilitation has not been effective	4	2	2	8	5	5	1	2	13	104	+	L	75%	Low	High
Security and night time lighting	Visual intrusion due to glare, light trespass and skyglow	4	2	2	8	5	5	1	2	13	104	-	L	• Choose suitable types of lighting that minimize glare and sky glow • Only focus light sources on where it is needed and utilize motion sensor lights where possible. • Consult a qualified lighting engineer or lighting specialist, should it be required. • No spotlights should be used, if possible.	2	1	2	5	2	2	1	2	7	35	-	L	75%	Low	High
Noise Impacts																														
Movement and operation of machinery, removal and transportation of infrastructure	Noise disturbance to sensitive receptors	4	2	2	8	4	3	5	2	14	112	-	L	• Limit activities to standard working hours. • Ensure all equipment and vehicles are serviced in accordance with the maintenance schedule. • Equipment and machinery used must comply with manufacturer's specifications and should not exceed regulated limits.. • Ensure a complaints register is available on site and that all noise complaints are addressed. • Strict adherence to the Construction EMP. • Constant monitoring and appointment of an ECO. • Implement a noise monitoring programme.	2	2	2	6	4	3	5	2	14	84	-	L	100%	Low	High
Heritage & Paleontological Impacts																														

Decommissioning activities	• Loss of / damage to heritage/archaeological resources • Loss of /damage to palaeontological resources	4	1	5	10	2	2	5	2	11	110	-	L	• Implement a Chance Find Protocol during decommissioning • Demarcate footprint areas clearly & ensure site clearance remain within the footprint area only • Restrict vehicles to travelling only on designated roadways • Strict adherence to the EMP • In the event that any sub-surface paleontologically or cultural heritage resources or graves are unearthed during decommissioning process all work has to be stopped until the site has been inspected and mitigated by an appropriately qualified practitioner with the necessary archaeological/paleontological background	2	1	5	8	1	1	5	2	9	72	-	L	100%	Low	High
Socio-Economic Impacts																																	
Decommissioning activities	Nuisance factors (dust, noise and traffic):	6	3	2	11	2	3	5	2	12	132	-	M	• Implement recommended mitigation measures for the reduction of dust generation and the suppression of dust. • Implement recommended mitigation measures for the reduction of noise. • Adhere to work schedule which limits construction to day time as far as possible. • Monitor air quality and noise levels • Maintain complaints register. Investigate complaints and keep a record of the investigation undertaken and results thereof and provide feedback to the complainant.	4	3	2	9	2	2	5	2	11	99	-	L	75%	Low	High
Decommissioning activities	Temporary job creation	6	2	2	10	4	4	1	2	11	110	+	L	• Ensure that contractors procure local labour, where possible, in accordance with Kangra's applicable policies and commitments. • Maintain the open and transparent recruitment procedures that are disclosed to community members • Use various mechanisms to advertise employment opportunities before commencement of construction • Provide or facilitate training of local people, such as through internships, scholarships, and/or vocational and skills training programmes	6	2	2	10	4	4	1	2	11	110	+	L	75%	Low	High
•Decommissioning activities	Influx of workers post operations	2	2	2	6	3	3	1	1	8	48	-	L	• Communicate the limitation of opportunities created by the project through established communication channels. • Apply the existing Kangra HR and Procurement Policies. • Integrate aspects of an influx management strategy into existing social management plans (i.e. SLP and Stakeholder Engagement Plan). • Maintain clear and decisive labour and recruitment policies that promote the interests of local residents and discourage opportunity seekers settling in the area.	2	2	2	6	2	2	1	1	6	36	-	L	75%	Low	High

ACTIVITY(S)	POTENTIAL ENVIRONMENTAL IMPACT	ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION												RECOMMENDED MITIGATION MEASURES	ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION											Confidence	Irreplaceable loss of resources	Degree of reversibility
		Severity	Spatial Scale	Duration	CONSEQUENCE	Freq of Activity	Freq of Impact	Legal Issues	Detection	LIKELIHOOD	Significance	+/-	RISK RATING		Severity	Spatial Scale	Duration	CONSEQUENCE	Freq of Activity	Freq of Impact	Legal Issues	Detection	LIKELIHOOD	Significance	+/-	RISK RATING			
CUMULATIVE IMPACTS																													
Air Quality & Climate																													
Use of roads, disturbances of surfaces, wind-borne dust from exposed areas and stockpiles	Increased contribution to generation of inhalable particle emissions and fugitive dust	6	2	4	12	4	4	5	2	15	180	-	M	• Reduction of speed limit (max 30km/h). • Restrict vehicle movement to designated work areas. • Wet suppression on exposed surfaces, unpaved roads, and materials handling areas-where feasible. • Minimise extent of disturbed areas. • Reduction of frequency of disturbance. • Stabilisation (chemical, rock cladding or vegetative) of disturbed soil. • Early/concurrent rehabilitation and re-vegetation, as appropriate on disturbed areas. • Implement measures to prevent dust outfall on vegetation.	2	2	2	6	1	2	1	2	6	36	-	L	100%	Low	High
Terrestrial Ecology																													
The development of the proposed infrastructure will contribute to cumulative habitat loss and thereby impact the ecological processes in the region.	The development of the proposed infrastructure will contribute to cumulative habitat loss and thereby impact the ecological processes in the region.	6	2	2	10	3	3	5	3	14	140	-	M	• Ensure that a rehabilitation plan and IAP management plan be compiled for each development and are effectively implemented.	6	2	2	10	2	3	5	3	13	130	-	M	75%	High	Low
Freshwater Ecology																													
Discharge of water which fails to meet discharge standards into the Heyshope Dam.	Pollution of the Heyshope Dam	8	2	3	13	3	4	5	3	15	195	-	M	The Operational Management Plan of the WWTW must make provision for regular treated effluent quality monitoring to take place to ensure that the treated effluent remains in the discharge limits that will be stipulated in the Water Use Licence for the discharge. If the discharge limits cannot be met, the discharge should be ceased up until such time as the limits associated with the licence can be produced.	4	2	2	8	1	3	5	3	12	96	-	L	75%	Medium	Medium
Continued imput of polluted water into wetland systems due to leakages of effluent from pipelines and plant	Contamination of wetland features	8	2	2	12	3	4	5	3	15	180	-	M	The Operational Management Plan of the WWTW must make provision for regular monitoring of the works to ensure that there are no leakages from the plant. The design of the WWTW must make provision for the discharge of any overflow effluent into the associated PCDs to ensure that the no untreated effluent is released from the works area. No untreated effluent will be allowed to be discharge from the WWTW. The Operational Management Plan should also make provision for the actions that must be taken in the event of an accidental spill form the works area. These should make provision for: •Containment of the leakage; •Collection of the effluent and possible contaminated soils; •Storage of the contained material; and •Removal and disposal from the site by registered service provider.	6	1	2	9	1	3	5	2	11	99	-	L	75%	Medium	Medium
Soils, Land Capability and Land Use																													
Seepage/leakages/overland flow from the CDF and oil spills and leaks from vehicles and machinery	Soil contamination	6	2	3	11	5	4	1	3	13	143	-	M	• Have emergency fuel & oil spill kits on site. • Implement Spill Management Procedure. Remove hydrocarbon contaminated soil and disposed of as contaminated waste.	4	2	3	9	3	2	1	3	9	81	-	L	75%	Low	High
Construction of permanent structures and damage to soil structure and quality	Loss of land capability	8	2	5	15	5	5	1	2	13	195	-	M	• Make use of existing roads or upgraded tracks before new roads are constructed. The number and width of internal access routes must be kept to a minimum; • A stormwater management plan must be implemented for the development. • The areas to be developed must be specifically demarcated to prevent movement of staff or any individual into the surrounding environments, access to these areas must be controlled. Signs must be put up to enforce this; • Stockpiles should be managed; and stripped soils properly demarcated according to their proper layers, especially the topsoil. Also prevent and minimise erosion (e.g., use of embedded geotextiles controls) and contamination from the stockpile; • Rehabilitation of the area must be initiated from the onset of the project. Soil stripped from infrastructure placement can be used for rehabilitation efforts; and • An alien invasive plant species and control programme must be implemented from the onset of the project.	8	2	5	15	5	5	1	2	13	195	-	M	75%	High	Low

Construction and operation of CDF and WWTP within an existing mining area	Soil interflow processes: • Infilling of wetlands and watercourses inducing alternative flow paths (if infilling occurs). • Alteration to natural hydropedological flow paths. • Impacts on the macro-soil structure. • Impacts on the hydropedological processes supporting the watercourses. Soil structure & land capability: • Exposure of soils, erosion and sedimentation of the watercourses. • Vegetation loss. • Soil compaction and erosion. Soil quality: • Natural nutrient content decreases due to soil exposure. • Loss of natural bio-organisms essential to soil processes.	8	3	2	13	5	4	1	3	13	169	-	M	• Only excavate areas applicable to the project area. • Backfill the material in the same order it was excavated to reduce contamination of deeper soils with shallow oxidised soils. • Cover excavated soils with a temporary liner to prevent contamination. • Keep the site clean of all general and domestic wastes. All development footprint areas are to remain as small as possible and vegetation clearing is to be limited to what is essential. • Retain as much indigenous vegetation as possible. • Exposed soils are to be protected using a suitable covering or revegetating. • Existing roads should be used as far as practical to gain access to the site, and crossing watercourses in areas where no existing crossing is apparent should be unnecessary, but if it is essential crossings should be made at right angles. • Have emergency fuel & oil spill kits on site. • Soil quality monitoring & visual assessments - monthly basis. If obvious pollution is noted (visually) then it is advised that soil screening be undertaken.	6	2	2	10	5	3	1	3	12	120	-	M	75%	High	Low
Geohydrological Aspects																															
Seepage from the CDF, PCDs and brine effluent pond • Poor quality seepage and runoff from vehicles parked at the site.	Contamination of vadose zone soils	4	2	4	10	4	3	5	3	15	150	-	M	• Keep the site clean of all general and domestic waste. • Water quality of the streams and sewer line monitoring. • Soil covers in areas where erosion is noted, and dust suppression of the landfill to prevent dust migration onto	4	2	4	10	2	2	1	3	8	80	-	L	100%	Medium	High
Seepage from the PCDs due to liner failure or overflows	Deterioration of groundwater quality	8	3	5	16	4	4	5	3	16	256	-	H	•Regular inspections of the liner. •Continued groundwater monitoring to detect potential seepage •Maintenance of the required freeboard.	2	2	4	8	3	2	5	3	13	104	-	L	100%	Low	High
Use liners and compaction of surfaces	Reduction to groundwater recharge over project area	2	2	4	8	4	4	1	2	11	88	-	L	No mitigation is possible. Liners are required to prevent groundwater contamination.	2	2	4	8	4	4	1	2	11	88	-	L	100%	Low	High
Hydrological Aspects																															
Seepage from the CDF and PCDs • Poor quality seepage and runoff from vehicles parked at the site.	Contamination of vadose zone soils	6	2	4	12	4	3	5	3	15	180	-	M	• Keep the site clean of all general and domestic waste. • Water quality of the streams and sewer line monitoring. • Soil covers in areas where erosion is noted, and dust suppression of the landfill to prevent dust migration onto	4	2	4	10	2	2	1	3	8	80	-	L	100%	Medium	High
Stormwater runoff from WWTP and co-disposal facility • Potential surface water contamination as a result of poor stormwater drainage on-site. • Increased erosion due to vegetation loss. • Contaminated runoff water into nearby streams from parked vehicles or overflow from PCDs. • Sedimentation of watercourses due to altered runoff patterns.	Contamination of surface water	10	2	4	16	5	4	5	2	16	256	-	H	• Implement appropriate approved stormwater management system. • Routine hydraulic monitoring of the stormwater system (monthly) • Rehabilitate exposed surfaces and monitor until vegetation establishment is successful. • Maintain sufficient freeboard in PCDs in accordance with the WUL requirements. • Operate WWTP in accordance with Standard Operating Procedures. •Prohibit movement or parking of vehicles outside of dirty water catchment. • Water quality monitoring and visual assessments.	2	2	4	8	4	3	5	2	14	112	-	L	100%	Medium	High
Seepage from the CDF	Poor quality seepage into the subsoils from landfill may impact soil quality, and eventually lead to poor quality seepage into the surroundings.	10	2	4	16	5	4	5	2	16	256	-	H	• Water quality monitoring and visual assessments. • Routine inspections of all stormwater systems. • Ensure the facility is lined. • Ensure slopes are shaped to prevent erosion. • Undertake concurrent rehabilitation to reduce the infiltration of rainwater.	4	2	4	10	5	3	5	2	15	150	-	M	100%	Medium	High
Visual Impacts																															
Visual impact of the CDF	Increasing size of CDF over the life of the facility	2	2	5	9	5	4	1	2	12	108	-	L	• CDF rise to be undertaken in accordance with design and to be overseen by engineer. • Compile and implement concurrent rehabilitation plan. • Use suitable building finishes/colours that blend in with the surrounding landscape	2	2	5	9	5	4	1	2	12	108	-	L	75%	Low	High
Security and night time lighting	Cumulative impacts regarding visual intrusion due to glare, light trespass and skyglow	2	2	4	8	4	4	1	2	11	88	-	L	• Choose suitable types of lighting that minimize glare and sky glow • Only focus light sources on where it is needed • Consult a qualified lighting engineer or lighting specialist • No spotlights should be used, if possible • Utilize motion sensor lights at security buildings	2	1	4	7	2	2	1	1	6	42	-	L	75%	Low	High
Socio-Economic Impacts																															
Construction activities	Temporary job creation and skills development	6	2	2	10	4	4	1	2	11	110	+	L	• Ensure that contractors procure local labour, where possible, in accordance with Kangra's applicable policies and commitments. • Maintain the open and transparent recruitment procedures that are disclosed to community members • Use various mechanisms to advertise employment opportunities before commencement of construction • Provide or facilitate training of local people, such as through internships, scholarships, and/or vocational and skills training programmes	6	2	2	10	4	4	1	2	11	110	+	L	75%	Low	High
Construction activities	Increase in nuisance factors: • Dust & noise could increase as a result of an increase in traffic • General construction activities resulting in an increase in fugitive dust emissions	4	3	2	9	2	2	5	3	12	108	-	L	• Implement recommended mitigation measures for the reduction of dust generation and the suppression of dust. • Implement recommended mitigation measures for the reduction of noise. • Adhere to work schedule which limits construction to day time as far as possible. • Monitor air quality and noise levels • Maintain complaints register. Investigate complaints and keep a record of the investigation undertaken and results thereof and provide feedback to the complainant.	4	3	2	9	2	2	5	2	11	99	-	L	75%	Medium	Medium