Parameters	Reason for the analysis
Chemical Parameters	
Temperature	Temperature can exert great control over aquatic communities. If the overall water body temperature of a system is altered, an aquatic community shift can be expected. In water above 30°C, a suppression of all benthic organisms can be expected. Also, different plankton groups will flourish under different temperatures. For example, diatoms dominate at 20 - 25 degrees C, green algae dominate at 30 - 35 degrees C, and cyano-bacteria dominate above 35 degrees C.
pH value	pH is an indicator of the existence of biological life as most of them thrive in a quite narrow and critical pH range.
Dissolved Oxygen (DO)	DO is essential for aquatic life. A low DO (less than 2mg/l) would indicate poor water quality and thus would have difficulty in sustaining many sensitive aquatic life.
Colour (Hazen)	Colour is vital as most water users, be it domestic or industrial, usually prefer colourless water. Determination of colour can help in estimated costs related to discolouration of the water.
Conductivity	Conductivity indicates the presence of ions within the water, usually due to in majority, saline water and in part, leaching. It can also indicate industrial discharges. The removal of vegetation and conversion into monoculture may cause run-off to flow out immediate thus decrease recharge during drier period. Hence, saline intrusion may go upstream and this can be indicated by higher conductivity.
Turbidity (NTU)	Turbidity may be due to organic and/or inorganic constituents. Organic particulates may harbour microorganisms. Thus, turbid conditions may increase the possibility for waterborne disease. Nonetheless, inorganic constituents have no notable health effects. The series of turbidity-induced changes that can occur in a water body may change the composition of an aquatic community. First, turbidity due to a large volume of suspended sediment will reduce light penetration, thereby suppressing photosynthetic activity of phytoplankton, algae, and macrophytes, especially those farther from the surface. If turbidity is largely due to algae, light will not penetrate very far into the water, and primary production will be limited to the uppermost layers of water. Cyanobacteria (blue-green algae) are favoured in this situation because they possess flotation mechanisms. Overall, excess turbidity leads to fewer photosynthetic organisms available to serve as food sources for many invertebrates. As a result, overall invertebrate numbers may also decline, which may then lead to a fish population decline. If turbidity is largely due to organic particles, dissolved oxygen depletion may occur in the water body. The excess nutrients available will encourage microbial breakdown, a process that requires dissolved oxygen. In addition, excess nutrients may result in algal growth. Although photosynthetic by day, algae respire at night, using valuable dissolved oxygen. Fish kills often result from extensive oxygen depletion.
Salinity	High salinity may interfere with the growth of aquatic vegetation. Salt may decrease the osmotic pressure, causing water to flow out of the plant to achieve equilibrium. Less water can be absorbed by the plant, causing stunted growth and reduced yields. High salt concentrations may cause leaf tip and marginal leaf burn, bleaching, or defoliation. As per Conductivity, salinity (NaCl content, g/kg) can be used to check for possible saline intrusion in future.

Parameters	Reason for the analysis
Total Suspended Solids, TSS	Total Suspended solids is an indication of the amount of erosion that took place nearby or upstream. This parameter would be the most significant measurement as it would depict the effective and compliance of control measures e.g. riparian reserve along the waterways. The series of sediment-induced changes that can occur in a water body may change the composition of an aquatic community. First, a large volume of suspended sediment will reduce light penetration, thereby suppressing photosynthetic activity of phytoplankton, algae, and macrophytes. This leads to fewer photosynthetic organisms available to serve as food sources for many invertebrates. As a result, overall invertebrate numbers may also decline, which may then lead to decreased fish populations. In addition, sediment may interfere with essential functions of organisms. The numbers of filter-feeding invertebrates will decline if their filter mechanisms are choked by suspended particles. Some zooplankton suffer decline due to clogged feeding mechanisms. Likewise, fish may suffer clogging and abrasive damage to gills and other respiratory surfaces. Abrasion of gill tissues triggers excess mucous secretion, decreased resistance to disease, and a reduction or complete cessation of feeding. Suspended sediment may also affect predator-prey relationships by inhibiting predators' visual abilities. Reproductive success may decline with an increase in fine sediment. If spawning habitats are altered by sediment deposition (e.g., filling of pools and riffles or covering of a gravel bed), fish may be unable to lay eggs. If eggs are successfully produced, the incubation period may be in jeopardy because 1) a shifting-sediment environment is unstable, and 2) burial by fine sediment prevents circulation of water around the egg, decreasing oxygenation. The egg will suffocate and may be poisoned by its own metabolic waste. If eggs do hatch into fry, the young may be less likely to survive in less-than-optimum conditions. The settling of suspended solids from turbid waters threatens benthic aquatic communities. Deposited particles may obscure sources of food, habitat, hiding places, and nesting sites. Most aquatic insects will simply drift with the current out of the affected area. Benthic invertebrates that prefer a low-silt substrate, such as mayflies, stoneflies, and caddis flies, may be replaced by silt-loving communities of oligochaetae, pulmonate snails, and chironomid larvae. Increased sediment may impact plant communities. Primary production will decline because of a reduction in light penetration. Sediment may damage plants by abrasion, scouring, and burial. Finally, sediment deposition may encourage species shifts because of a change of substrate. Sediment deposition may also affect the physical characteristics of the stream bed. Sediment accumulation causes stream bed elevation and a decrease in channel capacity. Flooding is more likely after sediment accumulation because the stream can not accommodate the same volume of water. Also, a substrate that is closer to the surface receives more light and supports increased numbers of photosynthetic organisms, such as rooted algae. As a result, recreational use may be threatened because moving parts of boats may become tangled in aquatic plants. Sediment, which is generally negatively charged, attracts positively charged molecules. Some of these molecules (phosphorus, heavy metals, and pesticides) are pollutants. These positively charged pollutants are in equilibrium with the water column and are often released slowly into the water resource.

Parameters	Reason for the analysis
Total Dissolved Solids, TDS	The total dissolved solids (TDS) in water consist of inorganic salts and dissolved materials. In natural waters, salts are chemical compounds comprised of anions such as carbonates, chlorides, sulphates, and nitrates (primarily in ground water), and cations such as potassium (K), magnesium (Mg), calcium (Ca), and sodium (Na). In ambient conditions, these compounds are present in proportions that create a balanced solution. If there are additional inputs of dissolved solids to the system, the balance is altered and detrimental effects may be seen. Inputs include both natural and anthropogenic source.
Biochemical Oxygen Demand, BOD	BOD is a measure of organic pollution to both waste and surface water. High BOD is an indication of poor water quality. For this tree plantation project, any discharge of waste into the waterways would affect the water quality and thus users downstream.
Chemical Oxygen Demand, COD	COD is an indicator of organics in the water, usually used in conjunction with BOD. High organic inputs trigger deoxygenation. If excess organics are introduced to the system, there is potential for complete depletion of dissolved oxygen. Without oxygen, the entire aquatic community is threatened. The only organisms present will be air- breathing insects and anaerobic bacteria. If all oxygen is depleted, aerobic decomposition ceases and further organic breakdown is accomplished anaerobically. Anaerobic microbes obtain energy from oxygen bound to other molecules such as sulphate compounds. Thus, anoxic conditions result in the mobilization of many otherwise insoluble compounds. In areas of high organics there is frequently evidence of rapid sewage fungus colonization. Sewage fungus appears as slimy or fluffy cotton wool-like growths of micro-organisms which may include filamentous bacteria, fungi, and protozoa such as *Sphaerotilus natans, Leptomitus lacteus, and Carchesium polypinuym*, respectively. The various effects of the sewage fungus masses include silt and detritus entrapment, the smothering of aquatic macrophytes, and a decrease in water flow velocities. An accumulation of sediment allows a shift in the aquatic system structure as colonization by silt-loving organisms occur. In addition, masses of sewage fungus may break off and float away, causing localized areas of dissolved oxygen demand elsewhere in the water body. Organic levels decrease with distance away from the source. In a standing water body such as a lake, currents are generally not powerful enough to transport large amounts of organics. In a moving water body, the saprotrophic organisms (organisms feeding on decaying organic matter) break down the organics during transportation away from the source. Hence, there is a decline in the oxygen demand and an increase of dissolved oxygen in the water. Community structure will gradually return to ambient with distance downstream from the source.
Ammoniacal Nitrogen	Ammonia levels in excess of the recommended limits may harm aquatic life. Although the ammonia molecule is a nutrient required for life, excess ammonia may accumulate in the organism and cause alteration of metabolism or increases in body pH. It is an indicator of pollution from the excessive usage of ammonia rich fertilisers.
Potassium	Potassium is macro nutrient element for plant growth. It can occur naturally in minerals and from soils. High levels in surface water, especially in areas where there are agricultural activities as indicative of introduction of K due to application of fertilisers.

Parameters	Reason for the analysis
Nitrate Nitrogen	The growth of macrophytes and phytoplankton is stimulated principally by nutrients such as nitrates. Many bodies of freshwater are currently experiencing influxes of nitrogen and phosphorus from outside sources. The increasing concentration of available phosphorus allows plants to assimilate more nitrogen before the phosphorus is depleted. Thus, if sufficient phosphorus is available, high concentrations of nitrates will lead to phytoplankton (algae) and macrophyte (aquatic plant) production. This is mostly due to the usage of fertilisers.
Oil & Grease	To check if there is any indiscriminate dumping of waste oil or poor management of oily waste within the site.
Microbiological	
Total Coliform Count Faecal Coliform Count	Microbiological test is to detect the Level of pollutions caused by living thing especially human who live or work in the area especially upstream of the site. These tests are based on coliform bacteria as the indicator organism. The presence of these indicative organisms is evidence that the water has been polluted with faeces of humans or other warm-blooded animals.
Pesticides	
Chlorinated Glyphosphate Paraquat Methamidaphos	These parameters are common tests for the level of agrochemical pollution. Since a specific type of agrochemical to use is unknown at this stage, it is unknown at this stage the type of agrochemical that would be used in the proposed development, a range of test is recommended for analysing to gauge the existing condition that could be used as baseline information or reference.