

# ATTACHMENT 1

## Mundaring Water Treatment Plant Site Selection Process – Prepared by Consultants GHD

### Summary of Site Information for Short-listed Sites, July 2007

#### Introduction

This document contains a summary of site information for the four short listed sites under consideration for the location of the Mundaring WTP. The document has been prepared by GHD using information provided by the Water Corporation and various external consultants. The detailed reports from which the summary information is taken are mentioned in the summary table and are available if further detail is required.

The information is to assist community participants complete their individual ranking on the four short listed sites and also describes the sustainability criteria that the Water Corporation will use to undertake its own multi-criteria assessment of the four sites.

The four remaining sites are:

#### Site 1

Below Mundaring Weir, on Mundaring Weir Road, south of the Helena River. This site is located in Reserve 5342 and includes Reserve 39644, which is vested in the Water Corporation for the purpose of Water Supply- Mundaring Weir, and is zoned Parks and Recreation in the Metropolitan Region Scheme (MRS).

Note that if Site 1 is selected, the chlorine store and the drying beds will be located at one of the other three sites.

#### Pine Plantation

Located to the north of Mundaring Weir, alongside an airstrip (managed by DEC). The site lies off Allen Road, to the east of Mundaring Weir Road. This site is within State Forest and is zoned Water Catchments and State Forest in the MRS.

#### DEC Land (formerly “CALM Land”)

DEC Land is a 20 ha site located at the current DEC depot to the east of Mundaring Weir Rd, at Mundaring Weir, WA. The site is located on State Forest and Freehold land owned by DEC.

#### O'Connor Site

The O'Connor site is a 39.7ha site located in State forest at the junction of Mundaring Weir Road and Firewood Road, north of the weir. The site is east of Mundaring Weir Road and north of Firewood Road.

This document firstly describes the 11 sustainability criteria that will form the basis of the multi-criteria analysis (MCA) that the Water Corporation will use to assist in its assessment of the sites. It then provides a summary table of the results of the studies undertaken to assess the impacts of each of these sites with respect to the sustainability criteria. A table with a summary of the major advantages and disadvantages is also included.

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### Description of Sustainability Criteria to be used in the MCA for the Mundaring WTP Site Selection

#### 1.1 Biodiversity

This criterion relates to the biodiversity values of the site, including the clearing footprint required. Biodiversity is the variety of all life forms, the different plants, animals and micro-organisms, the genes they contain, and the ecosystems of which they form a part.

In the case of the proposed Mundaring WTP, the issues to be considered under the sustainability criterion of impact on biodiversity are:

- ▶ The overall ecological value of the sites;
- ▶ The conservation significance of the sites;
- ▶ The clearing footprint required at the sites (the amount of native vegetation that will be cleared);
- ▶ The value of the site for native flora; specifically the diversity of native flora at the site, any significant flora species or vegetation types at the site and the health of the vegetation at the site;
- ▶ The value of the site for native fauna; specifically, the potential of the site to support native species, including significant species; the value of the site as fauna habitat and the use of the site as a habitat linkage.

#### 1.2 Embedded energy of assets

This criterion refers to the amount of energy that has been used to produce the materials from which the WTP will be constructed. Low embedded energy equates to low energy use and also low emissions of greenhouse gases, and is therefore a desirable environmental goal. Embedded energy relates to the quantity and types of materials used in the construction of the WTP, and in this case will be strongly correlated with the lengths of pipe required for each site (i.e. less pipe means less embedded energy).

Please note that the amount of energy required for operation of the sites has not been considered as this will be nearly identical for all sites and thus does not add any value to the comparison of sites.

#### 1.3 Waterways and water cycles

This criterion relates to the potential impacts of the WTP on waterways, which for this purpose includes river and stream systems and wetlands, and on watercycles. The desirable environmental goal for this criterion is that waterways (including minor drainage lines) and associated riparian vegetation, should be protected and development should be excluded from the buffer area of a waterway. The desirable environmental goal for water cycles is that the project would minimise impacts and alterations to the natural watercycles. This incorporates consideration of catchment

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issues. Protection of catchments occurs through restricting certain types of development in catchment areas and by implementing management measures for practices that carry a risk of contaminating surface and groundwater.

### 1.4 Potential for land degradation

Land degradation is a serious environmental problem in Western Australia and can be defined as the decline in condition or quality of the land as a consequence of human activities. For the purposes of the project this criterion addresses potential issues associated with the construction and operation of the WTP as they relate to erosion and soil degradation at the site and the potential to introduce diseases and weeds to the general area. When considering this criterion it is necessary to assess the current status of the land and the extent of degradation of the site, ie what soil degradation already occurs and whether weeds and diseases (specifically dieback) already occur at the site. It also assesses the sensitivity of the site to land degradation factors.

### 1.5 Hazardous chemical risks

While a number of chemicals are used in the water treatment process, the chlorine used for disinfection of the water is the most significant in terms of potential hazards outside the WTP boundaries. Chlorine is therefore the focus of the assessment of hazardous chemical risks. The risk assessment process involves identifying different scenarios under which chlorine could be released; modeling the resulting concentration of chlorine at various distances from the release; and assessing the acceptability with injury limits. While most of the sites meet the WA risk criteria, even in the event of a major chlorine release, some sites are closer to residences and recreational facilities and have therefore been assessed as having a slightly higher risk.

### 1.6 Community amenity

Community amenity is a general term often used to describe the potential impacts of a development on the lifestyle of the local community. In the case of the proposed Mundaring WTP, the issues considered under community amenity were: visual amenity, i.e. what the WTP looks like and what impacts it might have on the outlook from residents' properties, including impacts of plant lighting; noise, i.e. whether the noise generated by plant operations will affect local residents; and traffic, i.e. whether traffic entering and leaving the WTP site will create impacts in terms of noise, congestion or road safety.

### 1.7 Recreational and tourism values

This criterion relates to the potential impacts of the WTP on the users and managers of recreational and tourism facilities in the area, in terms of convenience and enjoyment. Some of these impacts may be direct, for example, some walking trails pass through proposed WTP sites or their buffer zones and these would have to be rerouted. Other impacts are less tangible, for example, the WTP may impact on the visual amenity of people using facilities such as picnic areas, museums, or scenic lookout.

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### 1.8 European heritage

Consideration of potential impacts of the WTP on European heritage has many dimensions. The construction of the WTP on some sites could disrupt historical artifacts or areas where it is expected that artifacts could be found based upon knowledge of the site's history, or could require old buildings to be moved from their original locations, which is undesirable from an interpretive perspective. On the other hand, as recognised by the National Trust, the WTP could have a positive contribution to heritage values, representing the latest chapter in the story of Mundaring Weir and the Goldfields water supply. Both potential negative aspects and positive enhancement opportunities have been taken into consideration in assessing the overall European heritage impacts of each site.

### 1.9 Indigenous heritage

The assessment of the indigenous heritage values of each site is based on the significance of the sites to the indigenous groups in the area, and the presence of archeological sites containing indigenous artifacts.

### 1.10 Site flexibility and operability

This criterion relates to the planning, design and operational phases of the project from an engineering perspective. Site flexibility is a reflection of the range of options available to planners and designers in configuring the WTP on the site, as well as the site's potential to accommodate changing circumstances and new technologies. Operability relates to the ease with which a plant located on the site could be operated and maintained on a daily basis, which is related to its layout and design. In assessing the flexibility and operability of each site the following factors were considered: expandability, topography, plant size, accessibility, security, ease of fire management, proximity to raw water and ease of discharge of backwash water.

### 1.11 Costs

The costs associated with the WTP at each potential site have been calculated by Water Corporation and expressed in terms of net present value (NPV), which is a standard method for the financial appraisal of long-term projects. It takes into consideration all future cash flows, capital and operating, and discounted them to a present value after tax. The total NPV figure for each site incorporates planning, design, construction, operating and maintenance costs over the life of the plant. Water Corporation uses a discount rate of 7.1%, an escalation (inflation) rate of 2.5% and a tax rate of 30%.

Operating costs depend on two major operating components; pumping and treating water. The significant difference in elevation (about 210m) between Mundaring Weir and the Sawyers Valley Tank contributes to nearly all the lifts required by the pumps. The frictional head losses are small. Treatment costs are similar for all sites. The amount of water to be treated is the same for all sites.

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Because pumping and treatment costs are similar for all sites, the total operating costs therefore will be similar for all four sites. And the present value of capital expenditures will provide a good basis to the comparison of sites.

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Table 1 Summary Table of Site-specific Information (Four short-listed sites)

Sustainability Criteria	Site One	DEC Land	Pine Plantation	O'Connor Site
<b>Environmental</b>				
Biodiversity	<p>Site One has been subject to a long history of disturbance. Most of the site is degraded with a high level of weed invasion.</p> <p><i>Source:</i>                      GHD (2007) <i>Mundaring Water Treatment Plant Site Selection: Preliminary Flora and Fauna Assessment – Site One, June 2007</i>                      GHD (2007) <i>Mundaring Water Treatment Plant Site Selection: Preliminary Spring Flora and Fauna Assessment – DEC Land, June 2007</i>                      GHD (2007) <i>Mundaring Water Treatment Plant Site Selection: Preliminary Spring Flora and Fauna Assessment – Pine Plantation Site, June 2007</i>                      GHD (2007) <i>Mundaring Water Treatment Plant Site Selection: Preliminary Flora and Fauna Assessment – O'Connor Site, June 2007</i></p> <p>The site contains remnant scattered mature Flooded Gum and Marri trees. The granite system in the east and the riparian vegetation near Helena River are still in relatively good condition. The conceptual plant layout shows that the majority of these areas will be retained.</p> <p>There may also be impacts on biodiversity depending on which of the other sites the chlorine store and drying beds will be located on.</p> <p>According to the conceptual layouts the WTP at Site One will require clearing of the following amount of vegetation rated condition <i>Good</i> (4) or better:</p> <ul style="list-style-type: none"> <li>▶ <i>Site One plus Chlorine and drying beds at DEC Land:</i> 2 ha in condition <i>Good</i> (4) or better.</li> <li>▶ <i>Site One plus Chlorine and drying beds at Pine Plantation:</i> 2.24 ha in condition <i>Good</i> (4) or better.</li> <li>▶ <i>Site One plus Chlorine and drying beds at O'Connor Site:</i> 5.68 ha in condition <i>Good</i> (4) or better.</li> </ul> <p>A Priority 3 flora species was recorded on the site but is outside the WTP footprint and impacts on this species can be avoided.</p> <p>The value of the site for native fauna is limited due to its degraded nature.</p> <p>If the WTP was located at Site One the existing pipelines from the weir can be utilised to carry the treated water from the weir to the site of the chlorine store. All the other sites will require a third pipeline north of the weir and this may require some clearing of native vegetation and have some impacts on biodiversity.</p>	<p>A significant portion of the site has been cleared in the past, with most of the central section being highly degraded and containing predominantly introduced species. There are some areas of native vegetation remaining, with good quality vegetation in the north of the site (gully system and granitic herblands) and to the east of the site (Jarrah-Marri Forest).</p> <p>The conceptual plant layout shows the WTP situated in the central area of the site where the vegetation is highly degraded. The layout impacts on 0.65 ha of vegetation rated condition <i>Good</i> (4) or better.</p> <p>The majority of the site has been significantly altered due to the old settlement that was located on it and would provide little value as habitat to native fauna species. Some species, particularly bird species could utilise the introduced garden plants for foraging, but in general the disturbances on the site have reduced its value for fauna.</p> <p>The northern section of the site has high habitat value as it contains a number of different habitat types, including granite outcrops and a gully system. The conceptual plant layout shows that this area will be retained.</p>	<p>The vegetation at this site is fairly uniform, with two main vegetation types occurring; a Jarrah-Marri forest in the north-west part of the site and a pine plantation in the south-east of the site.</p> <p>The pine plantation was generally Condition 5 (<i>Degraded</i>) as it contained predominantly introduced species, with some scattered natives.</p> <p>The conceptual plant layout shows the WTP situated primarily in the pine plantation with very little impact on the areas of native vegetation. This layout impacts on only 0.52 ha of vegetation rated as condition <i>Good</i> (4) or better at the site. However, there will be impacts on native vegetation from the requirement to widen the access track into the site. This will require vegetation adjacent to the existing Allen Rd to be cleared over the almost 1km of track into the site.</p> <p>The pine plantation offers limited value to native fauna, it provides some feeding habitat for species but is of less value than the native vegetation surrounding the plantation.</p> <p>This site requires a substantial length of access road, as well as pipelines. This will result in clearing of native vegetation and may also impact on fauna linkages as the access track and pipelines may result in a substantial barrier to fauna movement.</p>	<p>The majority of the O'Connor Site supports Jarrah and Marri Forest. The site has been logged previously and the vegetation is regrowth.</p> <p>Small sections of the site, particularly around the access track in the centre of the site are highly disturbed, and contain some planted non-native species. The condition of the vegetation improves away from the road and while there is disturbance evident in these areas the vegetation structure remains intact and the site retains the ability to regenerate to a better condition.</p> <p>The conceptual plant layout shows the WTP centred around the access track, which is the most degraded section of the site. However, this layout will still require clearing of native vegetation. This layout impacts on 12.98 ha of vegetation rated as condition <i>Good</i> (4) or better at the site.</p> <p>This site contains the largest contiguous area of native vegetation of all the sites. While this vegetation has been previously disturbed it still has the highest flora and fauna values of all the sites being considered in this assessment.</p>
Embedded energy	<p>Pipe Lengths</p> <ul style="list-style-type: none"> <li>▶ <i>Site One plus Chlorine and drying beds at DEC Land:</i> 3.2km, Rank 2nd</li> <li>▶ <i>Site One plus Chlorine and drying beds at Pine Plantation:</i> 5.1km, Rank 4th</li> <li>▶ <i>Site One plus Chlorine and drying beds at O'Connor Site:</i> 2.1km, Rank 1st (best)</li> </ul>	Pipe Lengths: 3.4km, Rank 3rd	Pipe Lengths: 5.3km, Rank 5th	Pipe Lengths: 9.9km, Rank 6 <sup>th</sup> (worst)
<i>Source: Relevant Water Corporation experts</i>				

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Sustainability Criteria	Site One	DEC Land	Pine Plantation	O'Connor Site
<p>Waterways and water cycles</p> <p>Source:</p> <p><i>GHD (2007) Mundaring WTP Site Selection: Preliminary Comparative Environmental Impact Assessment, Report prepared for Water Corporation, July 2007.</i></p>	<p>Two waterways (drainage lines) pass through this site. One flows through the gully in the centre of the site and one flows through the western section of the site. Both waterways drain into the Helena River. The Helena River passes through the north-west corner of the site. The conceptual plant layout shows that impacts on the Helena River and the western drainage line can be avoided but the central waterway will be impacted by the WTP.</p>	<p>There are two waterways (drainage lines) through this site, within the two gully systems that run east-west. These drainage lines are tributaries of Bending Gully, which runs south-west through Fred Jacoby Park (to the west of the site).</p> <p>The conceptual layout shows that the larger drainage line in the northern gully will not be impacted by the WTP. However, the smaller drainage line through the central gully will be impacted by the plant layout and the drainage in the central section of the site will be altered.</p>	<p>There is one waterway (drainage line) that flows south-west through the pine plantation site and drains to Mundaring Reservoir. This drainage line flows through the minor gully that is to the south of the central access track.</p> <p>This site is situated within a Reservoir Protection Zone. The Department of Water has indicated that if the WTP is to be located here substantial drainage works will be required to engineer the site out of the catchment. This will require an artificial drainage system that will drain the entire site to a sump. The drainage water would then need to be pumped out of the catchment area. This is a significant alteration of the hydrology of the site and will be very expensive to construct and operate. This process will also have ongoing energy requirements.</p> <p>This site will have the highest impact on waterways and watercycles</p>	<p>This site contains one waterway, in a gully along the southern boundary of the site. This waterway is a tributary of Bending Gully.</p> <p>The conceptual plant layout for this site shows that impact on waterways at this site have been generally avoided, with only the access track impacting on the drainage line in the south of the site.</p> <p>This site is expected to have the least impact on waterways and watercycles.</p>
<p>Potential for land degradation</p> <p>Source:</p> <p><i>GHD (2007) Mundaring WTP Site Selection: Preliminary Comparative Environmental Impact Assessment, Report prepared for Water Corporation, July 2007.</i></p>	<p>Site One has been historically disturbed and is subject to a number of ongoing disturbances. Much of the site is cleared or contains weedy species and the potential for land degradation at this site is low in comparison to the other sites.</p>	<p>Some areas of the site are sloped and have the potential to lead to land degradation. While much of the vegetation at the site is introduced and it contains a number of weedy species, the clearing of this vegetation has the potential to lead to erosional impacts.</p>	<p>While the WTP layout at this site is primarily within pine plantation it is surrounded by native vegetation. Additionally, native vegetation will need to be cleared for the access track into the site.</p> <p>Clearing of this site and the construction and operation of the WTP have the potential to cause land degradation of the areas of native vegetation adjacent to the site, particularly through the risk of the introduction of weed species and dieback.</p>	<p>This site is in the most natural condition of all the sites. It has the most complete native vegetation cover and has the least weed invasion. There is potential for construction and operation of the WTP to cause land degradation at this site.</p>
<p><b>Social</b></p>				
<p>Hazardous chemical risks</p> <p>Source:</p> <p><i>GHD (2007) Technical Note: Mundaring Water Treatment Plant Chlorine Storage and Dosing – Water Treatment Plant Location Sensitivities</i></p>	<p>Meets all EPA safety requirements. However, the Western Power Substation, Museum and Mundaring Weir Picnic Area and children's playground are within the injury impact zone, as are sections of the Kattamorda Trail, Munda Biddi Trail and Bibbulmun Track in the vicinity of Site 1. However, should Site 1 be selected as the preferred site, Water Corporation intends that the chlorination plant would be located at one of the other three sites, separate from the main water treatment plant. If no hazardous chemicals were stored at Site 1, EPA requirements would clearly be met and the chance of impacting members of the public would be minimal.</p>	<p>Meets all EPA safety requirements. The injury impact zone encroaches into sections of the Fred Jacoby Park, Munda Biddi Trail, Kep Track and Mundaring Loop Bike Trail, but this does not contravene EPA requirements for active open spaces.</p>	<p>Meets all EPA safety requirements. The injury impact zone only encroaches onto the airstrip south of the proposed site, and this does not contravene EPA requirements for active open spaces. Furthermore, the airstrip would only be used during an emergency, which makes any impact on the public extremely unlikely.</p>	<p>Meets all EPA safety requirements. The injury impact zone encroaches onto sections of the Munda Biddi Trail, Kep Track and Mundaring Loop Bike Trail, but this does not contravene EPA requirements for active open spaces. Furthermore, walkers would be at low risk of injury since they would be unlikely to be stationary within the impact zone.</p>
<p>Community amenity</p>	<p>Minimal, as no houses are located in the vicinity.</p> <p>The main impact on community amenity will be from transport to the site.</p> <p>However, depending on which site is used for the chlorine store and the drying beds there may be some impacts on community amenity from this additional area.</p>	<p>There are no private residences in the immediate vicinity of the site and impact on community amenity will be low. However, there are residences to the south and to the north of the site and potential indirect impacts on these residences are possible.</p>	<p>Minimal, as no houses are located in the vicinity.</p> <p>The main impact on community amenity will be from transport to the site.</p>	<p>This site is the closest of all the sites to residential properties. A buffer area has been retained between these properties and the site but amenity impacts for residence may still be an issue at this site.</p>

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Sustainability Criteria	Site One	DEC Land	Pine Plantation	O'Connor Site
<p>Tourism and recreational values</p> <p>Source: <i>GHD (2007) Mundaring WTP Site Selection: Preliminary Comparative Environmental Impact Assessment, Report prepared for Water Corporation, July 2007.</i></p>	<p>Within Site One there are picnic sites and public recreation areas. There are a number of walking trails, including the Bibbulmun Track, the Munda Biddi Trail and the Kattamorda Trail, that run very close to the site, both to the west and to the east along the weir wall.</p> <p>To the north of the site is a heritage and tourism area, which includes a museum, the C Y O'Connor memorial and walktrails. The Mundaring Hotel/ Mundaring Hall are located approximately 350m north from the site.</p> <p>The WTP at this site would be visible from public areas, including the weir wall, lookouts and picnic sites.</p> <p>Under the Mundaring Weir Masterplan Site One is within a proposed heritage-tourist precinct.</p>	<p>There are a number of tourist and educational facilities surrounding the DEC Land, including the Kookaburra Outdoor Cinema adjacent to the site, the Hills Forest Discovery Centre, about 100 across Allen Rd from the site, and Fred Jacoby Park, across Mundaring Weir Road.</p> <p>A number of walking trails pass through or near to the site, including the Kattamoorda Trail, Kep Track and the Mundaring Loop Bike Trail, which pass along the western edge of the site and then through its northern corner. Additionally, other major trails in the near vicinity are the Mundi Biddi trail, approximately 300m west, and the Bibbulmun track, approximately 50m south. The site is around 550m north-east of the picnic sites associated with Mundaring Weir and the Mundaring Weir Hotel is situated about 500m from the site.</p>	<p>The pine plantation site is relatively removed from the high use tourism and recreation areas around Mundaring Weir and impacts on recreation and tourism should be relatively low. However, a WTP site at this site may cause visual impacts on users of the Bibbulmun Track, which runs through the north-west corner of the site.</p>	<p>This site is surrounded by state forest and situated away from the recreational, tourism and heritage areas associated with the weir. However, the site is adjacent to Mundaring Weir Road and the Kattamoorda Trail, Kep Track, Munda Biddi Trail and Mundaring Loop Bike Trail are all located along the western boundary of the site.</p>
<p>Indigenous heritage</p> <p>Source: <i>Villiers, L (2007) Report of an Archaeological Survey of the Proposed Water Treatment Plant and Associated Infrastructure at Mundaring, Western Australia. Report prepared by Australian Interaction Consultants for Water Corporation</i></p>	<p>No archaeological sites found. Preferred site, as it is already highly disturbed.</p>	<p>No archaeological sites found. Retains some native vegetation and therefore it is possible that intact archaeological materials could be encountered during earthworks.</p>	<p>No archaeological sites found. Area currently under pines is already disturbed and therefore suitable for development. However, for area not under pine ( the northwest portion of the site) it is possible that intact archaeological materials could be encountered during earthworks.</p>	<p>No archaeological sites found. Least disturbed site and therefore there is a possibility of encountering archaeological materials during earthworks.</p>
<p>European heritage</p> <p>Source: <i>Rosario, R. (2007) Mundaring Weir Water Treatment Plant Heritage Advice: Preliminary European Heritage Survey Heritage Audit for Alternate Sites. Report prepared by Heritage and Conservation Professionals for Water Corporation</i></p>	<p>Contains a number of significant archeological sites. Close to Mundaring Weir, which is included in Shire of Mundaring's municipal heritage inventory. Due to its scale, it would be difficult to develop the WTP in manner sympathetic to the existing cultural precinct. Least preferred site by the National Trust and heritage consultant.</p>	<p>Significant heritage values. Location of one of the first divisional headquarters of the Forests Department. Contains a number of heritage buildings dating from the 1920s, some of which have been moved to the site. Construction of the WTP on this site would result in loss or relocation of the heritage buildings. Historically the cottages built by the forest department have been relocated and it would be possible to relocate any of the remaining buildings on this site if an alternative location is identified. However, the opportunity to interpret the history of the settlement in its original location would be lost.</p>	<p>No specific heritage issues associated with site. However, site is not favoured by the National Trust because it is too far from Mundaring Weir to allow for interpretation of the WTP as part of the ongoing story of Mundaring Weir and the goldfields water supply (i.e. to achieve a positive heritage outcome).</p>	<p>No existing heritage value. Opportunity for positive contribution to heritage values.</p>
<b>Economic</b>				
<p>Site flexibility and operability</p> <p>Source: <i>Workshop with relevant Water Corporation experts</i></p>	<p>Rates poorly due to site's constrained size, rugged topography and the need for remote location of the chlorination plant.</p>	<p>Good or acceptable performance with respect to all issues considered.</p>	<p>Rates lowest overall due to stringent water management requirements (due to location in Reservoir Protection Zone); poor fire management characteristics (due to dense vegetation and limited accessibility); and high security risk (due to relatively remote location).</p>	<p>Rates highest overall due to large area available and site accessibility. Good performance with respect to all issues considered, except for proximity to raw water.</p>

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**Table 2 Summary Advantage/Disadvantages Table (four short-listed sites)**

Site	Advantages	Disadvantages
Site 1	<ul style="list-style-type: none"> <li>▶ Close to Mundaring Weir, with cost and operational benefits</li> <li>▶ Site has been previously cleared and is predominantly degraded so biodiversity impacts will be low (though there may be biodiversity impacts on the additional site required for chlorine and drying beds)</li> <li>▶ Minimal impact on community amenity (depending on where the chlorine store and drying beds are located)</li> <li>▶ Site is already highly disturbed and therefore little chance of disrupting indigenous artefacts</li> <li>▶ Site One is the only site that will not require an additional main pipeline from the weir and thus will not have the associated impacts from the pipeline in a constrained area (potential social and environmental impacts)</li> </ul>	<ul style="list-style-type: none"> <li>▶ Chlorination plant must be located remotely, due to space and safety considerations. This additional location may have environmental and social issues associated with it.</li> <li>▶ Site has rugged topography and is constrained in size</li> <li>▶ Contains a number of significant European heritage archeological sites.</li> <li>▶ Difficult to develop the WTP in manner sympathetic to the existing cultural precinct. Will impact on existing landuses of the site, including recreation areas and the Western Power substation.</li> <li>▶ Will be visible from a number of locations, including lookouts</li> </ul>
DEC Land	<ul style="list-style-type: none"> <li>▶ Close to Mundaring – Kalgoorlie pipeline</li> <li>▶ Opportunity for positive contribution to heritage values as part of the ongoing story of Mundaring Weir and the Goldfields water supply</li> <li>▶ Much of the site is degraded and contains introduced species, impacts on flora and fauna will be minimal</li> <li>▶ Good or acceptable performance with respect to flexibility and operability of the site.</li> </ul>	<ul style="list-style-type: none"> <li>▶ Significant heritage values, including buildings that would be either lost or relocated, so the opportunity to interpret the history of the settlement in its original location would also be lost.</li> <li>▶ Adjacent to community facilities, including Fred Jacoby Park, Kookaburra Outdoor Cinema, Forest Discovery Centre</li> <li>▶ There would be a risk of disrupting indigenous artifacts</li> <li>▶ A number of walking and cycling trails pass through site, these may need to be rerouted</li> </ul>
Pine Plantation	<ul style="list-style-type: none"> <li>▶ WTP could be located in a pine plantation without major direct impacts on adjacent native vegetation.</li> <li>▶ Low risk of disrupting indigenous artefacts, as area under pine plantation is already disturbed</li> <li>▶ No existing European heritage values</li> <li>▶ Minimal impact on community</li> </ul>	<ul style="list-style-type: none"> <li>▶ Located within Reservoir Protection Zone and therefore not supported by Department of Water. Would require extensive drainage system (high cost and ongoing energy requirements)</li> <li>▶ Too far from Mundaring Weir to allow for interpretation of the WTP as part of the ongoing story of Mundaring Weir and the Goldfields water supply</li> </ul>

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Site	Advantages	Disadvantages
	<p>amenity due to remote location</p> <ul style="list-style-type: none"> <li>▶ Removed from heritage and tourism precinct</li> </ul>	<ul style="list-style-type: none"> <li>▶ The Bibbulmun Track passes through the site (potential indirect impacts)</li> <li>▶ Significant distance from Mundaring – Kalgoorlie pipeline – additional piping costs</li> <li>▶ Access route from Mundaring Weir Rd to site may impact on tourist areas such as Forest Discovery Centre</li> <li>▶ The access track will also require clearing of native vegetation and may impact on fauna linkages</li> <li>▶ Adjacent to DEC airstrip</li> </ul>
O'Connor Site	<ul style="list-style-type: none"> <li>▶ No existing European heritage values. Opportunity for positive contribution to heritage values as part of the ongoing story of Mundaring Weir and the goldfields water supply</li> <li>▶ Large site available, high level of flexibility</li> <li>▶ Close to Mundaring – Kalgoorlie pipeline</li> </ul>	<ul style="list-style-type: none"> <li>▶ Would require clearing of good quality vegetation</li> <li>▶ Least disturbed site and therefore there is a possibility of encountering archaeological materials during earthworks</li> <li>▶ Two private properties (including residences) adjacent to WTP boundary, plus other private properties nearby</li> <li>▶ A number of walking and cycling trails are adjacent to this site, these may be subject to aesthetic impacts or may need to be rerouted</li> <li>▶ Substantial lengths of additional pipeline required</li> </ul>