

MANDAI PARK HOLDINGS

ADDENDUM TO ENVIRONMENTAL IMPACT ASSESSMENT REPORT (26 September 2016)

(Last Updated 18 March 2019)

This addendum shall be read in conjunction with Mandai Park Holdings' (MPH) Environmental Impact Assessment (EIA) of the Mandai Rejuvenation Project ("Mandai EIA Report") dated 26 September 2016, and shall form part of the Mandai EIA Report.

Table of Contents

INTRODUCTION.....	3
01. DESIGN UPDATES TO THE MASTERPLAN	4
Change of Wastewater Treatment Plant (WTP) locations	5
02. APPROVED CHANGES TO THE ENVIRONMENTAL IMPACT ASSESSMENT (EIA) AND ENVIRONMENTAL MONITORING AND MANAGEMENT (EMMP) REQUIREMENTS.....	7
Works that need to be Conducted After 6pm	8
Adjustment of Working Days to Allow Works on Sunday	11
Tree Felling during Bird Breeding Season	13
Controlled Smoking and Burning of Religious Offerings	16
Waiver of Air Quality Threshold	19
Increase in Height of Hoardings	21

INTRODUCTION

Mandai Park Holdings (MPH) is driving the rejuvenation of Mandai Precinct into an integrated nature and wildlife destination, through its development arm, Mandai Park Development (MPD). From November 2014 to September 2016, MPD had conducted an Environmental Impact Assessment (EIA) for the project. EIAs are studies conducted to evaluate a proposed development's potential environmental impact and to recommend measures to mitigate the potential impact of development as much as reasonably practicable. MPH engaged stakeholders such as government agencies, the nature community, and individuals during the EIA process, to understand and address their concerns.

Following the approval of the Mandai EIA Report, and as the project progressed into the detailed design development and construction phases, MPD has continued to engage stakeholders, including representatives from the nature community, with regular updates and discussions on environmental management. As far as possible, design development and construction methods were aligned with the environmental management requirements stated in the Mandai EIA Report. However, as the design development and construction phases progressed, some refinements and/or changes in environmental management requirements were made so as to better account for unexpected developments, practicality and feasibility.

This document provides a summary of the design updates and approved changes to requirements listed in the Mandai EIA Report. For revisions in designs and/or changes in environmental management measures from that in the Mandai EIA Report, MPD has adhered to the required Change Management process and conducted a series of consultations with its Environmental Advisory Panel (EAP) and representatives from the nature community. Thereafter, MPD sought approval from the relevant Government agencies to formalise the changes to the Mandai EIA Report. These approved changes took into consideration the site constraints and construction methodology and include improvements to existing environmental management processes, refinements in designs and mitigation measures.

01. DESIGN UPDATES TO THE MASTERPLAN

S/N	ITEMS	APPROVED
01	Change of Wastewater Treatment Plant Locations	December 2017

MANDAI PARK HOLDINGS

Design Updates No. 1

Change of Wastewater Treatment Plant (WTP) locations	
Original Reference:	EIA Chapter 2.9 Infrastructure and Supporting Features
Original Design	The existing sewage treatment plant will be decommissioned and replaced by new WTPs. The original plan in the Mandai EIA Report was to locate a WTP within the carpark structure in the West Arrival Node, and a new WTP within the basement of the East Arrival Node.
Change Proposed	There will still be two new WTPs to meet the wastewater needs of the development. However, the first plant will be located within the future Bird Park, and the second plant will be located west of the development (refer to Figure 1.1 for detailed locations).
Rationale for change	<p>The original locations of the new WTPs were determined when the overall design of the development was at the master-planning stage. Upon a detailed study, these locations were assessed to be sub-optimal as the existing site constraints would entail construction and subsequent operational challenges.</p> <p>Taking into consideration factors such as impact on the environment and construction feasibility, the new WTP locations were chosen.</p> <p>The WTP sited west of the development will be constructed on impacted land, but as the location is in close proximity to the adjacent forest and a stream, a study on biodiversity impact was also carried out. The study concluded that there would be minor to negligible impact on fauna in the area, given that it is already impacted.</p> <p>(The Biodiversity Impact Assessment is available upon request. For a copy of the full report, please contact enquiry@mandai.com)</p>
Proposed Mitigation and Monitoring Measures	<p>Applicable mitigation measures in the Mandai EIA/EMMP will be applied into a contract-specific Environmental Management and Monitoring Plan.</p> <p>An additional Biodiversity Impact Study (Appendix 01) has been conducted and construction methods will be aligned with the primary recommendations.</p> <ol style="list-style-type: none"> 1. Protect integrity of stream slopes during all phases of the development, especially during construction. This may involve thorough investigation of soil quality and ability to withstand nearby construction works, maximising distance of heavy machinery works, hoarding and infrastructure to slope edge, avoiding works on slopes, erosion control measures, and adaptive management. 2. Conduct ongoing monitoring of slope integrity during construction and operational phases, with immediate stop-work and remediation if slope destabilisation or erosion is detected. 3. Conduct regular water testing of the stream to ensure it is not degraded beyond baseline EIA levels.

	<ol style="list-style-type: none"> 4. Minimise clearance of post-kampong secondary vegetation, particularly in the north of the site; retain large native trees where possible. 5. Establish measures to minimise vehicle-wildlife collisions such as vehicle speed limits, wildlife education for personnel, and fencing around retained vegetation. 6. Establish strict chemical containment procedures and ensure odour and noise pollution are restricted. 7. Replant retained vegetation with native plants during post-construction phase. <p>(The Biodiversity Impact Assessment is available upon request. For a copy of the full report, please contact enquiry@mandai.com)</p>
Date of Approval	December 2017

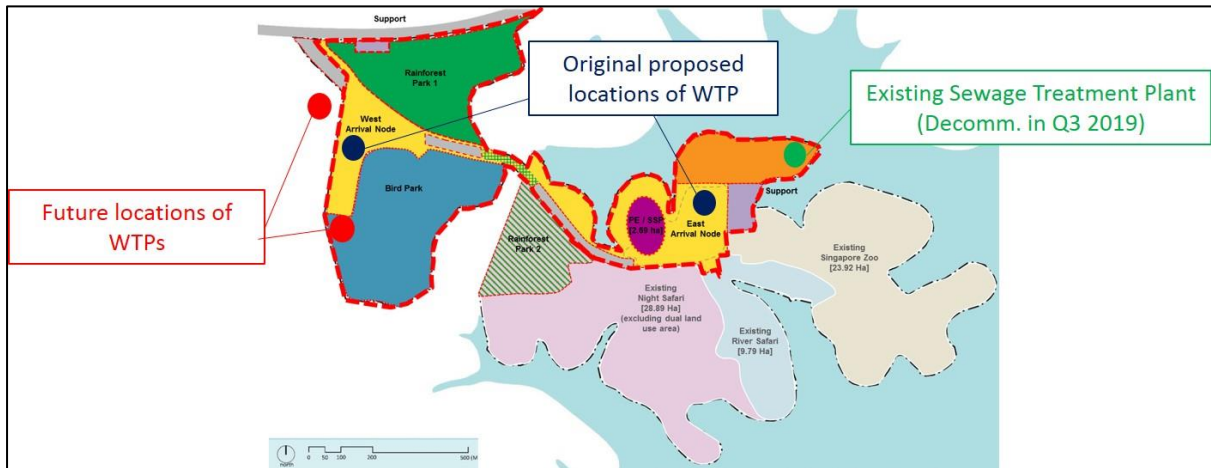


Figure 1.1: Future locations of WTPs for Mandai Development

02. APPROVED CHANGES TO THE ENVIRONMENTAL IMPACT ASSESSMENT (EIA) AND ENVIRONMENTAL MONITORING AND MANAGEMENT (EMMP) REQUIREMENTS

S/N	ITEMS	APPROVED
01	Works that Need to be Conducted After 6pm	June 2017
02	Adjustment of Working Days to Allow Works on Sundays	
03	Tree Felling during Bird Breeding Season	
04	Controlled Smoking and Burning of Religious Offerings	March 2018
05	Waiver of Air Quality Threshold	
06	Increase in Height for Hoardings	

MANDAI PARK HOLDINGS

Approved Change from EIA No. 1

Works that need to be Conducted After 6pm	
Original Reference:	Annex 18.0 Wildlife Protection Plan Chapter 4
Original requirements	Access to the construction site for works is permitted only from 8am to 6pm, Mondays to Saturdays, except under extraordinary circumstances that are subject to MPH's and NParks' approval.
Change Proposed	To allow access to the construction site for works between 12am to 6am, after the operating hours of current attractions, for public safety reasons. - Beam launching across Mandai Lake Road - Oversized and heavy deliveries regulated by the LTA Road Act
Rationale for change	Works that may compromise public safety such as beam launching across live roads and delivery of heavy machinery on public roads will need to be conducted when there is less traffic on the roads. This is to reduce potential hazards to the public in the unforeseen event of collapse or toppling.
Changes to Impact Assessment (Refer to the Impact Assessment below)	Without mitigation, the magnitude of impact from noise and light on fauna within the Project Vicinity during construction is considered to be 'Medium'. Impacts from noise can cause disturbance and displacement of resident fauna species during construction, reducing species utilisation of habitats. Increase in luminance levels and presence of workers due to night-time works may also result in wildlife behavioural or distributional changes. Species likely to be affected on this site based on our fauna monitoring include sambars, wild boars, long-tailed macaques, civets, lesser mousedeers and Sunda pangolins. Application of additional mitigation measures will reduce the magnitude of impacts from noise and light on fauna during the beam launching works conducted at night from 'Medium' to 'Small'. The residual impacts will likely affect a small proportion of species population, but does not substantially affect other species dependent on it. There is no change to the impact assessment in the Mandai EIA Report.
Proposed Mitigation and Monitoring Measures	All EMMP requirements relating to reducing impacts of construction noise to fauna will be applied including: a) Noise modelling will be conducted for each of the works and mitigation measures tailored accordingly. b) Noise barrier of Sound Transmission Class 20 will be installed at the engine or noisy parts of the machinery. c) Continuous noise monitoring will be carried out by hand-held noise meter. d) Monitoring of real-time noise readings installed at the edge of Central Catchment Nature Reserve (CCNR). e) MPD Wildlife Response and Rescue Protocol will be adhered to. f) Workers will be briefed to be mindful and keep a look out for wildlife.

	<p><u>Additional measures to take during beam-launching works at night</u></p> <ul style="list-style-type: none"> a) Lighting used will be downward facing, directed towards working area, and away from sensitive areas including the Temporary Ground Crossing (TGC) and CCNR. b) Lighting provision will only be sufficient to perform the work based on the Ministry of Manpower's requirement on risk assessment. c) Site lighting locations will be reviewed to ensure minimal impact on surrounding biodiversity. d) Temporary barriers will be deployed to close the TGC during launching works or where necessary.
Date of Approval	June 2017

Proposed Activity:

To allow access to the construction site for works between 12am and 6am, after the operating hours of current attractions, in consideration of public safety reasons.
 - Beam launching across Mandai Lake Road;
 - Oversized and heavy deliveries regulated by LTA.

Personnel involved in Impact Assessment:

MPD Environmental Management Office (EMO)

	RECEPTORS	SCREENING * (Changes in Interactions of the Proposed Activity with Receptors with reference to what had been assessed in the EIA)	REMARKS	EIA RESIDUAL IMPACTS (Gazetted EIA)			MITIGATION MEASURES	RESIDUAL IMPACTS (After Approved Change)		
				MAGNITUDE**	SENSITIVITY/ VULNERABILITY/ IMPORTANCE**	IMPACT SIGNIFICANCE***		MAGNITUDE**	SENSITIVITY/ VULNERABILITY/ IMPORTANCE**	IMPACT SIGNIFICANCE***
Physical	Air Quality	No Change		Not Applicable	Not Applicable	Not Applicable		Not Applicable	Not Applicable	Not Applicable
	Ambient Noise (WRS ¹ Staff and Visitors)	No Change		Not Applicable	Not Applicable	Not Applicable		Not Applicable	Not Applicable	Not Applicable
	Surface Water Quality	No Change		Not Applicable	Not Applicable	Not Applicable		Not Applicable	Not Applicable	Not Applicable
	Soil / Groundwater Quality	No Change		Not Applicable	Not Applicable	Not Applicable		Not Applicable	Not Applicable	Not Applicable
Biological	Terrestrial Habitats (Noise)	Insignificant Changes in Interaction (not expected to be significant)		Small	High	Moderate		Small	High	Moderate
	Terrestrial Flora & Fauna (Noise)			Small	High	Moderate		Small	High	Moderate
	Aquatic Habitats (Stream 15)	No Change		Not Applicable	Not Applicable	Not Applicable		Not Applicable	Not Applicable	Not Applicable
	Aquatic Flora & Fauna (Stream 15)	No Change		Not Applicable	Not Applicable	Not Applicable		Not Applicable	Not Applicable	Not Applicable
	Protected Areas (CCNR)	Insignificant Changes in Interaction (not expected to be significant)		Small	High	Moderate		Small	High	Moderate

*Screening - No Change, Insignificant Changes (not expected to be significant), Significant Change in Interaction, Positive Change in Interaction. Based on EIA (Mandai) Chapter 5.1

** Based on EIA proposed methodology. Refer to EIA Annex 2.0

*** Impact assessment shall be made based on the following Impact Assessment Matrix as per adopted in EIA. Refer to Mandai EIA Report Chapter 4.0.

¹ Wildlife Reserves Singapore is a subsidiary company under Mandai Park Holdings and current operator of Jurong Bird Park, Night Safari, River Safari and Singapore Zoo.

MANDAI PARK HOLDINGS

Approved Change from EIA No. 2

Adjustment of Working Days to Allow Works on Sunday	
Original Reference:	Annex 18.0 Wildlife Protection Plan Chapter 4
Original requirements	Access to the construction site for works is permitted only from 8am to 6pm, Mondays to Saturdays, except under extraordinary circumstances that are subject to MPH and NParks' approval.
Change Proposed	To allow access to the construction site for works from Mondays to Sundays, 8am to 6pm.
Rationale for change	To allow for timely completion of project milestones and the possibility of an overall shorter construction duration. It is acknowledged that crepuscular hours are important and hence, working hours are kept to 8am to 6pm.
Changes to Impact Assessment (Refer to the Impact Assessment below)	<p>Without mitigation, the magnitude of impact from noise on fauna within the Project Vicinity during construction is considered to be 'Medium'. Noise impacts can cause disturbance and displacement of resident fauna species during construction, reducing species utilisation of habitats.</p> <p>Mitigation measures have been designed to reduce the duration and intensity of noise at source during construction. Results from the fauna monitoring programme show that resident animals in Project Vicinity, such as wild boars, sambars, mousedeers, civet cats and pangolins, are mainly active at night. Hence, working hours on Sundays, other than for emergencies or safety reasons, will also be kept to 8.00am to 6.00pm.</p> <p>Application of mitigation measures during construction works on Sundays will reduce the magnitude of impacts on fauna within the Project Vicinity from 'Medium' to 'Small'. The residual impacts will likely affect a small proportion of a species population, but does not substantially affect other species dependent on it.</p> <p>There is no change to the impact assessment in the Mandai EIA Report.</p>
Proposed Mitigation and Monitoring Measures	<p>All relevant EMMP requirements prescribed for works on Monday to Saturday will be applied to Sunday as well. These include but are not limited to the following:</p> <ul style="list-style-type: none"> a) keeping to the noise threshold at the CCNR b) wildlife inspection regime within sites c) bird inspection regime before felling of trees d) Wildlife Response and Rescue Protocol <p>The ongoing fauna monitoring regime will also highlight if there are any adverse impact on the environment. If an adverse impact is anticipated, MPD will consult its Environmental Advisory Panel, biodiversity advisor, relevant nature community representatives, and the authorities.</p>
Date of Approval	June 2017

Proposed Change / Activity:

To allow access to the construction site for works from Mondays to Sundays, 8am to 6pm.

Personnel involved in Impact Assessment:

MPD Environmental Management Office (EMO)

	RECEPTORS	SCREENING * (Changes in Interactions of the Proposed Activity with Receptors with reference to what had been assessed in the EIA)	REMARKS	EIA RESIDUAL IMPACTS (Gazetted EIA)			MITIGATION MEASURES	RESIDUAL IMPACTS (After Approved Change)		
				MAGNITUDE**	SENSITIVITY/ VULNERABILITY/ IMPORTANCE**	IMPACT SIGNIFICANCE***		MAGNITUDE**	SENSITIVITY/ VULNERABILITY/ IMPORTANCE**	IMPACT SIGNIFICANCE***
Physical	Air Quality (Staff)	Insignificant Changes in Interaction (not expected to be significant)		Small	Medium	Minor		Small	Medium	Minor
	Air Quality (Visitors)	No Change	Number of unique visitors visiting the zoos will not vary significantly from Saturdays, hence there are no expected increment or decrease in air impacts to the unique visitors.	Not Applicable	Not Applicable	Not Applicable		Not Applicable	Not Applicable	Not Applicable
	Ambient Noise (WRS Staff)	Insignificant Changes in Interaction (not expected to be significant)		Small	Medium	Minor		Small	Medium	Minor
	Ambient Noise (Visitors)	No Change	Number of unique visitors visiting the zoos will not vary significantly from Saturdays, hence there are no expected increment or decrease in noise impacts to the unique visitors.	Not Applicable	Not Applicable	Not Applicable		Not Applicable	Not Applicable	Not Applicable
	Surface Water Quality	No Change		Not Applicable	Not Applicable	Not Applicable		Not Applicable	Not Applicable	Not Applicable
	Soil / Groundwater Quality	No Change		Not Applicable	Not Applicable	Not Applicable		Not Applicable	Not Applicable	Not Applicable
Biological	Terrestrial Habitats (Noise)	Insignificant Changes in Interaction (not expected to be significant)		Small	High	Moderate		Small	High	Moderate
	Terrestrial Flora & Fauna (Noise)	Insignificant Changes in Interaction (not expected to be significant)		Small	High	Moderate		Small	High	Moderate
	Aquatic Habitats (Stream 15)	No Change		Not Applicable	Not Applicable	Not Applicable		Not Applicable	Not Applicable	Not Applicable
	Aquatic Flora & Fauna (Stream 15)	No Change		Not Applicable	Not Applicable	Not Applicable		Not Applicable	Not Applicable	Not Applicable
	Protected Areas (CCNR)	Insignificant Changes in Interaction (not expected to be significant)		Small	High	Moderate		small	High	Moderate

*Screening - No Change, Insignificant Changes (not expected to be significant), Significant Change in Interaction, Positive Change in Interaction. Based on Mandai EIA Report Chapter 5.1

** Based on EIA proposed methodology. Refer to EIA Annex 2.0

*** Impact assessment shall be made based on the Impact Assessment Matrix as per adopted in EIA. Refer to Mandai EIA Report Chapter 4.0

MANDAI PARK HOLDINGS

Approved Change from EIA No. 3

Tree Felling during Bird Breeding Season	
Original Reference:	Annex 18.0 Wildlife Protection Plan Chapter 3.4
Original requirements	Tree felling or transplanting will not occur during the prime breeding season for local avifauna, i.e. the months from approximately mid-March to July annually. In any case, if active nests are detected on the tree, nests will be left undisturbed until nesting activities are completed.
Change Proposed	To allow felling of trees during bird breeding season.
Rationale for change	<p>While forest birds have been recorded to breed during the Bird Breeding Season from approximately mid-March to July, in reality, breeding varies according to species and circumstances (e.g. if conditions remain favourable, birds with failed nesting may try again outside the usual breeding period). Instead of restricting tree works to a certain period of the year, it is more realistic to ensure that pre-work assessment and confirmation by a suitably qualified bird specialist is done.</p> <p>By allowing trees to be felled throughout the year, overall construction period can be shortened.</p>
Changes to Impact Assessment (Refer to the Impact Assessment below)	Clearing trees with appropriate care can be conducted without incremental adverse impact to breeding activity of birds. There are sufficient measures that can be adopted to ensure that local avifauna would continue to be protected should trees need to be felled during bird breeding season (see below for more details). There is no change to the impact assessment in the Mandai EIA Report.
Proposed Mitigation and Monitoring Measures	<p>Pre-felling Wildlife Inspection</p> <p>Inspections of vegetation and ground for indication of wildlife activity or habitation are required before any vegetation clearance activity. Inspections are to include the identification and reporting of:</p> <ul style="list-style-type: none"> a) Bird activity or active bird nests, including but not limited to nests, hollows, and other forms of nesting structure utilised by birds, b) Mammals and active mammal nests/burrows/habitation c) Herpetofauna, and d) Other wildlife of conservation significance <p>During the Singapore key bird breeding season (March – July), any wildlife inspection must be attended by an experienced Bird Specialist. During clearing activity beyond key bird breeding season (August – February), an experience/qualified Ecologist will lead inspections and reporting.</p> <p>The contractor’s Bird Specialist and/or Ecologist will be directed to the tree/vegetation area to be cleared, wherein systematic inspection of trees, shrubs and ground will be undertaken. The extent of inspection will be considered according to expected clearing according to the inspection period validity. The</p>

	<p>Contractor Bird Specialist/Ecologist will be present on site during felling activities to identify the immediate presence of fauna before clearing.</p> <p>All EMMP requirements relating to wildlife discovery and management will be applied including:</p> <ul style="list-style-type: none"> a) Wildlife inspection regime i.e. inspecting site for animal activity before the start of work and during works within sites. b) Wildlife Response and Rescue Protocol i.e. when wildlife is identified on site, MPD/WRS responder team will be alerted to recover/rescue the wildlife from site.
Date of Approval	June 2017

Proposed Activity:

Tree Felling During Bird Breeding Season (with inspection of trees before felling by specialist; trees with signs of bird nesting will not be felled)

Personnel involved in Impact Assessment:

MPD Environmental Management Office (EMO)

	RECEPTORS	SCREENING * (Changes in Interactions of the Proposed Activity with Receptors with reference to what had been assessed in the EIA)	REMARKS	EIA RESIDUAL IMPACTS (Gazetted EIA)			MITIGATION MEASURES	RESIDUAL IMPACTS (After Approved Change)		
				MAGNITUDE**	SENSITIVITY /VULNERABILITY /IMPORTANCE**	IMPACT SIGNIFICANCE***		MAGNITUDE**	SENSITIVITY /VULNERABILITY /IMPORTANCE**	IMPACT SIGNIFICANCE***
Physical	Air Quality (Staff)	No Change		Not Applicable	Not Applicable	Not Applicable		Not Applicable	Not Applicable	Not Applicable
	Air Quality (Visitors)	No Change		Not Applicable	Not Applicable	Not Applicable		Not Applicable	Not Applicable	Not Applicable
	Ambient Noise (WRS Staff)	No Change		Not Applicable	Not Applicable	Not Applicable		Not Applicable	Not Applicable	Not Applicable
	Ambient Noise (Visitors)	No Change		Not Applicable	Not Applicable	Not Applicable		Not Applicable	Not Applicable	Not Applicable
	Surface Water Quality	No Change		Not Applicable	Not Applicable	Not Applicable		Not Applicable	Not Applicable	Not Applicable
	Soil / Groundwater Quality	No Change		Not Applicable	Not Applicable	Not Applicable		Not Applicable	Not Applicable	Not Applicable
Biological	Terrestrial Habitats	No Change		Not Applicable	Not Applicable	Not Applicable		Not Applicable	Not Applicable	Not Applicable
	Flora & Fauna (Disturbance and Displacement of Fauna)	Insignificant Changes in Interaction (not expected to be significant)		Small	High	Moderate		Small	High	Moderate
	Aquatic Habitats (Stream 15)	No Change		Not Applicable	Not Applicable	Not Applicable		Not Applicable	Not Applicable	Not Applicable
	Aquatic Flora & Fauna (Stream 15)	No Change		Not Applicable	Not Applicable	Not Applicable		Not Applicable	Not Applicable	Not Applicable
	Protected Areas (CCNR)	No change		Not Applicable	Not Applicable	Not Applicable		Not Applicable	Not Applicable	Not Applicable

*Screening - No Change, Insignificant Changes (not expected to be significant), Significant Change in Interaction, Positive Change in Interaction. Based on Mandai EIA Report Chapter 5.1

** Based on EIA proposed methodology. Refer to EIA Annex 2.0

*** Impact assessment shall be made based on the Impact Assessment Matrix as per adopted in EIA. Refer to Mandai EIA Report Chapter 4.0.

MANDAI PARK HOLDINGS

Approved Change from EIA No. 4

Controlled Smoking and Burning of Religious Offerings	
Original Reference:	Annex 18.0 Wildlife Protection Plan Chapter 4
Original requirements	There shall be no smoking, use of joss sticks, burning of any religious offerings, and cooking or heating of food within the construction site and in the adjacent forested areas at all times.
Change Proposed	To allow controlled smoking and burning of religious offerings at designated locations away from CCNR, and with supervision and contingency measures.
Rationale for change	Allowing designated locations for smoking and burning of religious offerings will provide for better control over the risks of a fire (with designated location far from flammable material) and reduce the risk of smokers finding their own means to smoke.
Changes to Impact Assessment (Refer to the Impact Assessment below)	The assessment methodology draws reference to Annual Average Daily Traffic (AADT) to assess impact of emissions from fugitive emissions. AADT of 100 heavy duty vehicle or 500 Light Duty Vehicle are assessed to be Negligible per impact assessment methodology, allowance of controlled smoking will have lesser impact. Hence, the resultant impact magnitude is assessed to be ‘Negligible’. In comparison to the gazetted EIA, there is no change to the impact assessment in the Mandai EIA Report.
Proposed Mitigation and Monitoring Measures	<ul style="list-style-type: none"> a) All smoking points will be designated and located within the site and towards Mandai Lake Road and away from the CCNR. b) Each contractor will be limited to a maximum of two smoking points and one religious offerings burning location per contract. c) All smoking points will be equipped with appropriate firefighting equipment and proper containment/disposal of waste cigarettes and ashes. d) All burning of religious offerings must be supervised and no open fires are to be left unsupervised. e) Appropriate firefighting equipment will be provided during all burning of religious offerings. f) All burning of religious offerings will be limited to a 2m x 2m area and approved by MPD Environmental Management Office (EMO) prior to burning the offerings. g) Controlled smoking and religious offering areas should not result in litter entering PUB’s reservoirs. Reservoirs have been designated as non-smoking premises. h) There will be no burning or smoking within buffer or setback areas. i) The restrictions on smoking and burning of religious offerings will be clearly communicated to on-the-ground workers. j) MPD EMO will monitor how workers respond to the measures as part of the EMMP process. k) MPD EMO will consolidate contractors’ requests as far as possible so that contractors working in the same phase are able to share the same smoking or burning points.
Date of Approval	March 2018

Proposed Activity:

Controlled Smoking at Designated Locations

Personnel involved in Impact Assessment:

MPD Environmental Management Office (EMO)

	RECEPTORS	SCREENING * (Changes in Interactions of the Proposed Activity with Receptors with reference to what had been assessed in the EIA)	REMARKS	INITIAL IMPACTS (Gazetted EIA)			MITIGATION MEASURES	RESIDUAL IMPACTS (After Approved Change)		
				MAGNITUDE**	SENSITIVITY/ VULNERABILITY / IMPORTANCE**	IMPACT SIGNIFICANCE***		MAGNITUDE**	SENSITIVITY/ VULNERABILITY/ IMPORTANCE**	IMPACT SIGNIFICANCE**
Physical	Air Quality	Positive Interaction	May result in positive control through the avoidance of workers smoking clandestinely	Negligible	Low	Negligible	<ul style="list-style-type: none"> All smoking points shall be designated and to be located within the site towards Mandai Lake Road, away from CCNR. All smoking points to be provided with appropriate firefighting equipment and proper containment/disposal of waste cigarettes and ashes. 	Negligible	Low	Negligible
	Ambient Noise	No Change		Not Applicable	Not Applicable	Not Applicable		Not Applicable	Not Applicable	Not Applicable
	Surface Water Quality	No Change		Not Applicable	Not Applicable	Not Applicable		Not Applicable	Not Applicable	Not Applicable
	Soil / Groundwater Quality	No Change		Not Applicable	Not Applicable	Not Applicable		Not Applicable	Not Applicable	Not Applicable
Biological	Terrestrial Habitats	No Change		Not Applicable	Not Applicable	Not Applicable		Not Applicable	Not Applicable	Not Applicable
	Terrestrial Flora & Fauna	No Change		Not Applicable	Not Applicable	Not Applicable		Not Applicable	Not Applicable	Not Applicable
	Aquatic Habitats (Stream 15)	No Change		Not Applicable	Not Applicable	Not Applicable		Not Applicable	Not Applicable	Not Applicable
	Aquatic Flora & Fauna (Stream 15)	No Change		Not Applicable	Not Applicable	Not Applicable		Not Applicable	Not Applicable	Not Applicable
	Protected Areas (CCNR)	No Change		Not Applicable	Not Applicable	Not Applicable		Not Applicable	Not Applicable	Not Applicable

*Screening - No Change, Insignificant Changes (not expected to be significant), Significant Change in Interaction, Positive Change in Interaction. Based on EIA (Mandai) Chapter 5.1

** Based on EIA proposed methodology. Refer to EIA Annex 2.0

*** Impact assessment shall be made based on the following Impact Assessment Matrix as per adopted in EIA. Refer to EIA(Mandai) Chapter 4.0.

Proposed Activity:

Controlled and Supervised Burning of Religious Offerings

Personnel involved in Impact Assessment:

MPD Environmental Management Office (EMO)

	RECEPTORS	SCREENING * (Changes in Interactions of the Proposed Activity with Receptors with reference to what had been assessed in the EIA)	REMARKS	INITIAL IMPACTS (Gazetted EIA)			MITIGATION MEASURES	RESIDUAL IMPACTS (After Approved Change)		
				MAGNITUDE* *	SENSITIVITY/ VULNERABILITY / IMPORTANCE**	IMPACT SIGNIFICANCE ***		MAGNITUDE* *	SENSITIVITY/ VULNERABILITY/ IMPORTANCE**	IMPACT SIGNIFICANCE ***
Physical	Air Quality	Insignificant Changes in Interaction (not expected to be significant)		Negligible	Low	Negligible	<ul style="list-style-type: none"> All burning of religious offerings must be supervised and no open fires shall be left unsupervised Appropriate firefighting equipment will be provided during all burning of religious offerings All burning of religious offerings shall be approved by MPD EMO prior to burning 	Negligible	Low	Negligible
	Ambient Noise	No Change		Not Applicable	Not Applicable	Not Applicable		Not Applicable	Not Applicable	Not Applicable
	Surface Water Quality	No Change		Not Applicable	Not Applicable	Not Applicable		Not Applicable	Not Applicable	Not Applicable
	Soil / Groundwater Quality	No Change		Not Applicable	Not Applicable	Not Applicable		Not Applicable	Not Applicable	Not Applicable
Biological	Terrestrial Habitats	No Change		Not Applicable	Not Applicable	Not Applicable		Not Applicable	Not Applicable	Not Applicable
	Terrestrial Flora & Fauna	No Change		Not Applicable	Not Applicable	Not Applicable		Not Applicable	Not Applicable	Not Applicable
	Aquatic Habitats (Stream 15)	No Change		Not Applicable	Not Applicable	Not Applicable		Not Applicable	Not Applicable	Not Applicable
	Aquatic Flora & Fauna (Stream 15)	No Change		Not Applicable	Not Applicable	Not Applicable		Not Applicable	Not Applicable	Not Applicable
	Protected Areas (CCNR)	No Change		Not Applicable	Not Applicable	Not Applicable		Not Applicable	Not Applicable	Not Applicable

*Screening - No Change, Insignificant Changes (not expected to be significant), Significant Change in Interaction, Positive Change in Interaction. Based on EIA (Mandai) Chapter 5.1

** Based on EIA proposed methodology. Refer to EIA Annex 2.0

*** Impact assessment shall be made based on the following Impact Assessment Matrix as per adopted in EIA. Refer to EIA(Mandai) Chapter 4.0.

MANDAI PARK HOLDINGS

Approved Change from EIA No. 5

Waiver of Air Quality Threshold	
Original Reference:	Mandai EIA/EMMP item 18
Original requirements	Maintain air quality below the stipulated air quality threshold of 50ug/m ³ (i.e. Singapore Ambient Air Quality Target for 24 Hour PM ₁₀) and conduct continuous monitoring.
Change Proposed	To remove the stipulated threshold of 50ug/m ³ .
Rationale for change	After consultations with NEA and air quality consultants, it was found that the proposed threshold of 50ug/m ³ Singapore Ambient Air Quality for 2020 was for an urban built-up setting, and hence not appropriate for a construction setting. Currently, there is no established threshold for a construction setting.
Changes to Impact Assessment (Refer to the Impact Assessment below)	The same mitigation measures stated in the gazetted EIA will be provided except for this threshold which is not applicable to construction site. As such the magnitude of impacts will be the same as the gazetted EIA and , there is no change to the impact assessment in the Mandai EIA Report.
Proposed Mitigation and Monitoring Measures	MPD will continue to monitor the air quality at the locations listed in the Mandai EIA Report and require contractors to deploy dust suppression measures as well as implement industry best practices. These include: <ol style="list-style-type: none"> a. Deployment of appropriate source control such as periodic wetting of exposed earth surfaces prone to wind erosion; coverage of exposed surfaces with tarpaulin or erosion control blankets; laying steel plates for vehicular routes b. Limiting speed within construction site to a maximum of 10km/hr c. Regular maintenance of vehicular access routes to remove soil litter
Date of Approval	March 2018

Proposed Activity:

Removal of EIA stipulated air quality threshold of 50mg/L

Personnel involved in Impact Assessment

MPD Environmental Management Office (EMO)

	RECEPTORS	SCREENING* (Changes in Interactions of the Proposed Activity with Receptors with reference to what had been assessed in the EIA)	REMARKS	INITIAL IMPACT (Gazetted EIA)			MITIGATION MEASURES	RESIDUAL IMPACT (After Approved Change)		
				MAGNITUDE*	SENSITIVITY/ VULNERABILITY/ IMPORTANCE**	IMPACT SIGNIFICANCE***		MAGNITUDE*	SENSITIVITY/ VULNERABILITY/ IMPORTANCE**	IMPACT SIGNIFICANCE***
Physical	Air Quality	No Change	MPD will continue to monitor the air quality at the locations proposed by EIA and will continue to require contractors to deploy dust suppression measures as recommended by EIA.	Not Applicable	Not Applicable	Not Applicable		Not Applicable	Not Applicable	Not Applicable
	Ambient Noise	No Change		Not Applicable	Not Applicable	Not Applicable		Not Applicable	Not Applicable	Not Applicable
	Surface Water Quality	No Change		Not Applicable	Not Applicable	Not Applicable		Not Applicable	Not Applicable	Not Applicable
	Soil / Groundwater Quality	No Change		Not Applicable	Not Applicable	Not Applicable		Not Applicable	Not Applicable	Not Applicable
Biological	Terrestrial Habitats	No Change		Not Applicable	Not Applicable	Not Applicable		Not Applicable	Not Applicable	Not Applicable
	Terrestrial Flora & Fauna	No Change		Not Applicable	Not Applicable	Not Applicable		Not Applicable	Not Applicable	Not Applicable
	Aquatic Habitats (Stream 15)	No Change		Not Applicable	Not Applicable	Not Applicable		Not Applicable	Not Applicable	Not Applicable
	Aquatic Flora & Fauna (Stream 15)	No Change		Not Applicable	Not Applicable	Not Applicable		Not Applicable	Not Applicable	Not Applicable
	Protected Areas (CCNR)	No Change		Not Applicable	Not Applicable	Not Applicable		Not Applicable	Not Applicable	Not Applicable

*Screening - No Change, Insignificant Changes (not expected to be significant), Significant Change in Interaction, Positive Change in Interaction. Based on EIA (Mandai) Chapter 5.1

** Based on EIA proposed methodology. Refer to EIA Annex 2.0

*** Impact assessment shall be made based on the following Impact Assessment Matrix as per adopted in EIA. Refer to EIA(Mandai) Chapter 4.0.

MANDAI PARK HOLDINGS

Approved Change from EIA No. 6

Increase in Height of Hoardings	
Original Reference:	Mandai EIA/EMMP item 56
Original requirements	Stipulated hoardings along the worksite boundary with the CCNR shall be constructed using the same material as acoustic barriers and shall be a maximum height of 2.4m. The recommended height of 2.4m for hoardings will enable the movement of arboreal fauna, while preventing human and terrestrial fauna from accessing the construction site.
Change Proposed	Minimise interaction between arboreal wildlife (colugo) and construction activities by increasing the height of the hoardings to a potential maximum of 9.0m, based on topography, surrounding vegetation structure, and an understanding of colugo flight dynamics.
Rationale for change	Multiple incidents of colugo entry to site indicate that the initial requirement for a restricted maximum height of 2.4m for the hoarding may not be sufficient. An increase in height of hoardings may reduce wildlife attempts to glide to vertical structures and reduce the rate of incidence of site entry. It will also assist in the mitigation of noise, light, and visual impact.
Changes to Impact Assessment (Refer to the Impact Assessment below)	With the proposed increase in height of hoardings to a potential maximum of 9.0m, there are positive changes in terms of air quality, ambient noise, and terrestrial flora and fauna to the impact assessment in the Mandai EIA Report. In terms of impact to fauna, the increase in height will not affect connectivity so much that it will cause substantial change in the population of the colugo. Per impact assessment methodology, the magnitude of the impact is 'Small', hence, there is no change to the impact significance.
Proposed Mitigation and Monitoring Measures	The height of the hoardings (to a maximum of 9.0m) was determined through the application of available topographical, vegetation spatial data and input from local colugo autecology experts to form a robust justification. MPD will continue to monitor wildlife through regular site inspections of hoarding (inside and outside of site).
Date of Approval	March 2018

Proposed Activity:

Higher hoarding (between 3.6 – 9.0m) for areas with high risk of wildlife entry with the following provision:
 -Hoarding colour to reduce the chances of hoarding impact during mid-glide – high contrast, horizontal colourations
 -Tailored hoarding height determined by calculations of average tree height (considering trunk-based launching point), topography and tree distance from hoarding
 -High contrast dark/light colouration of horizontal panels
 -Vertical poles on the outer edge of hoarding (lower than hoarding) to attract colugos / avoid collision

Personnel involved in Impact Assessment:

MPD Environmental Management Office
 MPD Project Management

	RECEPTORS	SCREENING * (Changes in Interactions of the Proposed Activity with Receptors with reference to what had been assessed in the EIA)	REMARKS	INITIAL IMPACTS (Gazetted EIA)			MITIGATION MEASURES	RESIDUAL IMPACTS (After Approved Change)		
				MAGNITUDE**	SENSITIVITY/VULNERABILITY/IMPORTANCE**	IMPACT SIGNIFICANCE***		MAGNITUDE*	SENSITIVITY/VULNERABILITY/IMPORTANCE**	IMPACT SIGNIFICANCE**
Physical	Air Quality	Positive Interaction	Higher hoarding height can mitigate displacement of dust from site into surrounding forested areas.	Not Applicable	Not Applicable	Not Applicable		Not Applicable	Not Applicable	Not Applicable
	Ambient Noise	Positive Interaction	Higher hoarding height can mitigate noise from site	Not Applicable	Not Applicable	Not Applicable		Not Applicable	Not Applicable	Not Applicable
	Surface Water Quality	No Change		Not Applicable	Not Applicable	Not Applicable		Not Applicable	Not Applicable	Not Applicable
	Soil / Groundwater Quality	No Change		Not Applicable	Not Applicable	Not Applicable		Not Applicable	Not Applicable	Not Applicable
Biological	Terrestrial Habitats	Insignificant Changes in Interaction (not expected to be significant)	The hoarding will retain its function to block out terrestrial fauna access.	Negligible	Negligible	Negligible		Negligible	Negligible	Negligible
	Terrestrial Flora & Fauna	Positive Interaction	Risk of arboreal species entering site is reduced, thereby also reducing harm to them. This positive interaction is assessed to outweigh the negative interaction of potential increase of arboreal mammal collision with hoarding.	Not Applicable	Not Applicable	Not Applicable		Not Applicable	Not Applicable	Not Applicable
	Aquatic Habitats (Stream 15)	No Change		Not Applicable	Not Applicable	Not Applicable		Not Applicable	Not Applicable	Not Applicable
	Aquatic Flora & Fauna (Stream 15)	No Change		Not Applicable	Not Applicable	Not Applicable		Not Applicable	Not Applicable	Not Applicable
	Protected Areas (CCNR)	Insignificant Changes in Interaction (not expected to be significant)	There may be directional influence to localised wind patterns in the CCNR. However, these impacts will be mitigated by the buffer areas.	Negligible - there may be minor changes to wind patterns	Medium	Negligible		Negligible	Medium	Negligible

*Screening - No Change, Insignificant Changes (not expected to be significant), Significant Change in Interaction, Positive Change in Interaction. Based on EIA (Mandai) Chapter 5.1

** Based on EIA proposed methodology. Refer to EIA Annex 2.0

*** Impact assessment shall be made based on the following Impact Assessment Matrix as per adopted in EIA. Refer to EIA(Mandai) Chapter 4.0.

