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NOISE AND VIBRATION MANAGEMENT PLAN

3	18/08/2016	Updated based on changes to project configuration and response to MM EPAP (Action Item #16)	MFC		
2	22/04/2015	Response LSP's Comments	ERM	See attachment of reviewer's signature	
1	25/02/2015	Response LSP's Comments	ERM	See attachment of reviewer's signature	
0	14/01/2015	Issue For Review	ERM	See attachment of reviewer's signature	
REV.	DATE (dd/mm/yyyy)	DESCRIPTION	PREPARED	CHECKED	APPROVED

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ATTACHMENT OF REVIEWER'S SIGNATURE

No.	Name	Position	Signature
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2	Le Duy Dong	HSE Manager	
3	Kitti Phadungchiwit	Manager of Package A	
4	Somsak Sombatboriboon	Manager of Package BCD	
5	Wason Srisupap	Manager of Package E	
6	Nisit Jintawong	Manager of Package F & H	
7	Amnat Pheerawat	Manager of Package G	
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REVISION LOG

Rev.	Date (dd/mm/yyyy)	Revised Detail			
		Item	Page	Article	Description
0	14/01/2015	all	all	all	Issue For Review
1	25/02/2015	all	all	all	Response LSP's Comments
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3	18/08/2016				Updated to reflect project changes and response to MM EPAP (Action Item #16)

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ACRONYMS


ASP	Air Separation Plant
BOC	Balance of Complex
CTU	Central Utility Plant
EHS	Environmental, Health and Safety
ESIA	Environmental and Social Impact Assessment
HDPE	High Density Polyethylene
HSE	Health, Safety and Environment
HSSE	Health, Safety, Security and Environment
IFC	International Finance Corporation
LLDPE	Linear Low Density Polyethylene
LSP	Long Son Petrochemicals
MP	Management Plan
PP	Polypropylene
PS	Performance Standard
QVCN	National Technical Regulation

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DISCLAIMER

It is upon the Contractor to solicit, acquire and comply with all information, laws, rules, regulations, and Applicable Standards which is/are necessary and/or required for and applicable to the Contractor's performances of the works hereunder.

The Contractor hereby agrees and acknowledges that the Employer makes no representation or warranty, express or implied, regarding the accuracy or completeness of any or all information, laws, rules, regulations, and Applicable Standards which is/are necessary and/or required for and applicable to the Contractor's performances of the works hereunder. THE EMPLOYER HEREBY EXPRESSLY DISCLAIMS ANY WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE OR ALL RESPECTS, and the Contractor agrees that neither the Employer nor any of its affiliate(s), director(s), officer(s), employee(s), consultant(s), professional advisor(s), and duly authorised representative(s) shall have any liability to the Contractor or any of its affiliate(s), director(s), officer(s), employee(s), consultant(s), professional advisor(s), and duly authorised representative(s) in any way relating to those information, laws, rules, regulations, and Applicable Standards which is/are necessary and/or required for and applicable to the Contractor's performances of the works hereunder or the Contractor's or its affiliate(s)', director(s)', officer(s)', employee(s)', consultant(s)', professional advisor(s)', and duly authorised representative(s)' reliance thereupon and/or use thereof.

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1 INTRODUCTION

1.1 PURPOSE AND SCOPE

The purpose of this Noise and Vibration Management Plan (MP) is to set out *[insert contractor name here]* approach to manage and mitigate the residual noise and vibration impacts that they have control over, as identified in Chapter 11 of the project's Environmental and Social Impact Assessment (ESIA) and Long Son Petrochemical's (LSP) Construction Health, Safety and Environment Management Plan (ref: LSP-1S01-005).

It should be noted the information in this Noise and Vibration MP is based on relevant regulations, guidelines and standards at the time of writing of the ESIA dated December 2014. Should the contractors activities change or new regulations, guidelines or standards apply the contractor will review, amend and resubmit this Noise and Vibration MP to LSP.

[Note to contractor: If your onsite activities do not have the potential to cause noise and vibration impacts, you do not need to complete this template but will need to provide justification as to why it is not applicable, e.g. you will be not be undertaking activities associated with the identified sources of noise shown detailed in Section 1.3.]


1.2 PROJECT OVERVIEW

The Long Son Petrochemicals Complex Project is located in Hamlet 2 and Rach Gia Hamlet, Long Son Commune, Vung Tau City, Ba Ria – Vung Tau Province, Vietnam. The Complex is spread over 464 ha, including area for its future expansion.

The Project will be comprised of two (2) main components:

1) The Petrochemical Plant, which consists of the following plants and units:

- Main Production Plants
 - Olefins Plant
 - High Density Polyethylene (HDPE) Plant
 - Linear Low Density Polyethylene (LLDPE) Plant
 - Polypropylene (PP) Plant
- Supporting Units
 - Central Utility Plant (CTU) (contains a Steam Generation Unit and Water Plant)
 - Tank Farm

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- Common Infrastructure

2) The Seaport, which consists of the following components:

- Hydrocarbon Jetty - to transfer feedstock and product for the Petrochemical Plant
- Construction Jetty - to import construction materials, including heavy lift modules.

1.3 NOISE AND VIBRATION SOURCES

The potential noise and vibration sources during construction are as follows:

- Rock blasting activities;
- Site clearing and leveling activities;
- Soil improvement activities;
- Pile driving;
- Infrastructure system and building construction activities;
- Seaport construction activities; and
- Plant construction activities.

The construction schedule for the noise and vibration sources during construction is shown in Annex A.


[Note to contractor: Contractor to insert Gantt chart of construction schedule in Microsoft Project Office format in Annex A, which should include a breakdown of the tasks that give rise to noise and vibration sources, as noted above]

Regarding exposure to noise and vibration impacts, a number of sensitive receptors were identified (see Chapter 11 of the ESIA), including: four residential houses (K1 – K4) located in proximity to the Project's boundary, Long Son 1 Elementary School, Bach Dang Secondary School, Long Son Medical Service Unit, Long Son Temple, Long Son Ancient Shrine, and the Whale Temple.

1.4 APPLICABLE STANDARDS

The applicable noise and vibration standards during construction are as follows

- QCVN 26:2010/BTNMT National Technical Regulation on Noise;
- QCVN 27:2010/BTNMT National Technical Regulation on Vibration;
- QCVN 02:2008/BCT National Technical Regulation on Safety in the Storage, Transportation, Use and Disposal of Industrial Explosive Materials; and


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- 2007 IFC General EHS Guidelines (Noise 1.7) which provide recommended ambient noise level and control measures.

During construction activities, significant sources of vibration will be rock blasting and pile driving. Vibration impact is assessed according to QCVN 02:2008/BCT National technical regulation on safety in the storage, transportation, use and disposal of industrial explosive materials.

The noise standard for the Project is the most stringent of either QCVN 26:2010/BTNMT National Technical Regulation on Noise or the IFC General EHS Guidelines (1.7): Noise. In this instance, the most stringent standard is that of the 2007 IFC General EHS Guidelines (Noise 1.7).

The applicable noise and vibration standards for the Project are shown in **Annex B**.

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2 ROLES AND RESPONSIBILITIES

2.1 INTRODUCTION

Having an appropriate organisational structure in place, with all people having defined roles and responsibilities, is essential to ensuring the overall success of this Noise and Vibration MP. This section provides details of LSP's and the contractor's organisational structure with regards to onsite delivery of the LSP project, and the various roles and responsibilities of those people in relation to delivering the clients EHS expectations, including meeting the requirements of the LSP Construction Health, Safety and Environment Management Plan (ref: LSP-1S01-005).

2.2 LSP CONSTRUCTION HSSE TEAM

LSP's health, safety, security and environmental (HSSE) team will lead the management of HSSE issues concerned with noise and vibration impacts. The LSP organisational chart to implement the requirements of this Noise and Vibration MP is shown in the figure below. The specific roles and responsibilities are shown in Chapter 5 of the LSP Construction Health, Safety and Environment Management Plan (ref: LSP-1S01-005).



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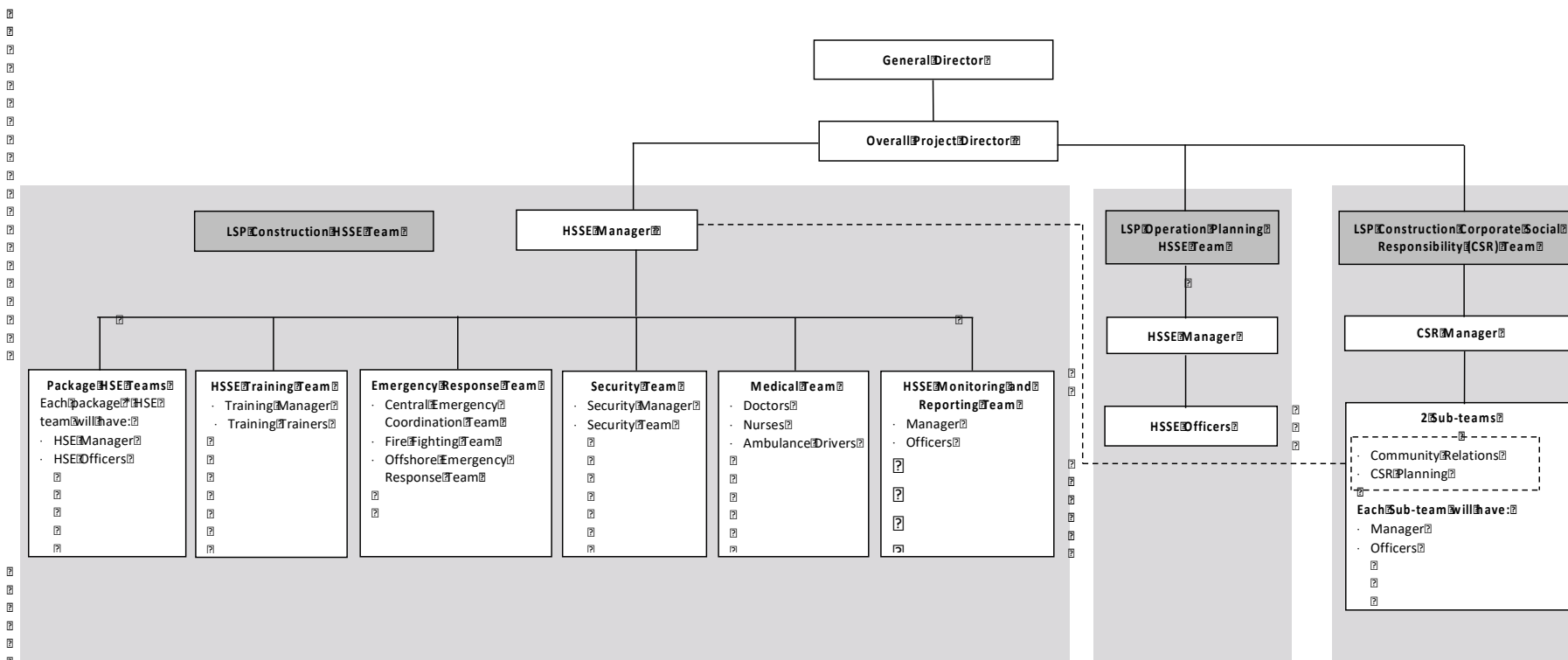
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Note:

Package A: Defines Plant, Tank Farm, Complex Interconnecting Pipelines/pipe racks, Land development in tank farm area, Topside facilities in hydrocarbon jetties, Complex Wastewater treatment unit and HP flare/LP flare system

Package B/C/D: Polyolefins Plant (HDPE/PP/LLDPE)


Package E: Sea Port (excluding topside in the hydrocarbon jetties and construction jetty which are under the scope of the Contractor Package A and Package B respectively)

Package F: Central Utility Plant (including steam generation unit and water plant)

Package G: Common infrastructure in the complex (including administration building, Laboratory building, Canteen building, Emergency Center, First Aid Center and Polyolefins Product Warehouse)

Package H: Complex road including drainage, street lighting, CCTV, green area, Top site for construction jetty, complex truck scale, and blown film system

Package I: Land development work in the whole complex except tank farm area

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2.3 **CONTRACTORS HSSE TEAM**

The contractors HSSE team has established this Noise and Vibration MP in accordance with the applicable standards. The contractors HSSE team will manage their contractors and suppliers in accordance with this Noise and Vibration MP and liaise with the appropriate personnel within LSP's HSSE to ensure compliance with the overall aims of LSP's Construction Health, Safety and Environment Management Plan (ref: LSP-1S01-005).

The contractors' onsite organisational chart to implement the requirements of this Noise and Vibration MP is shown in the figure below.

[Note to contractor: Contractor to insert organisational chart for onsite team].

2.4 **DESCRIPTION OF ROLES AND RESPONSIBILITIES**

The contractor has committed to providing the necessary human resources to ensure that the organisational structure noted above can work to implement this Noise and Vibration MP and achieve compliance with all relevant standards. A description of the key roles and their responsibilities are provided in **Error! Reference source not found.**, including the primary communication channel between LSP and contractor HSE teams. Employee contact details for each role associated with this Noise and Vibration MP are provided in Annex C.



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Table 2.1 *EHS Roles and Responsibilities within Contractor's Project Team*

Role	Responsibilities
General Manager (Contractor)	
Senior Site Engineer (Contractor)	
Site Supervisor / Foreman (Contractor)	
Site EHS Officer (Contractor)	
Emergency Response Co-ordinator (Contractor)	
[Other]	
[Other]	

[Note to Contractor: Insert a description of the responsibilities of each role, with regards to the management of EHS and Noise and Vibration. Delete roles that are not appropriate. Include additional roles where required.]

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3 **MITIGATION / MANAGEMENT PROCEDURES**

The mitigation / management procedures noted in this section provide the approach to managing the potential noise and vibration impacts from the construction activities. The contractor is committed to implementing the identified mitigation / management procedures in order to not cause exceedance of the applicable noise and vibration standards, and to avoid impacts on the local community.

The mitigation / management measures that are relevant to *[insert contractors name here]* onsite activities are shown in **Error! Reference source not found..**

The mitigation / management procedures were identified within the ESIA as being appropriate for the environmental impacts resulting from the anticipated construction activities. Should noise and vibration impacts arise from the contractors activities, following the implementation of the procedures noted in **Error! Reference source not found.**, the contractor will review the need for additional measures to be taken and update this Noise and Vibration MP accordingly.

Note to contractor: Delete mitigation / management measures which are not applicable or outside of your control. Insert the name of the responsible party from Table 2-1 for each mitigation / management measure.



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Table 3.1 Mitigation / Management Procedures

Aspect, Potential Impact / Issue	Mitigation Reference	Mitigation and / or Management Procedures	Contractors Responsibility	Related Plans
Noise Impact from Construction Equipment/Machineries during the Construction Phase	1.1	Acoustic barriers will be installed at the Northern Project boundary, North-eastern Project boundary, and Eastern Project boundary, as close to source or receptor to ensure the noise impact on the nearest residential houses is minimised.		-
	1.2	Hours of general construction activity will be restricted (especially mobile sources operating through community areas) to avoid sensitive periods of the day and night.		-
	1.3	Effective noise controls will be implemented which will include: regular inspection and maintenance of all vehicles and construction equipment working onsite, installation of sound suppressive devices (such as mufflers) on all mechanical plants as necessary, where practicable, vehicles and machinery that are used intermittently will not be left idling for long periods of time.		Air Quality Management Plan (Point Sources) (ref: LSP-1S01-0008)
	1.4	The carrying out of piling work and blasting will be prohibited before 06.00 hrs and after 18.00 hrs.		
	1.5	Acoustic enclosures will be installed around noisy equipment.		-
	1.6	Where acoustic enclosures can't be used, equipment emitting high noise will be placed in orientation that directs the noise away from sensitive receptors.		-
Vibration Impact during the Construction Phase	1.7	Foundations for machine platforms will be constructed with high quality concrete.		-
	1.8	Anti-vibration rubber gaskets and springs will be installed for machines with high capacity for generating vibration.		-
	1.9	Impact pile driving where possible, in vibration-sensitive areas will be assessed.		-
	1.10	Impact or impulse tools should not be used from 5.00 p.m. to 8.00 a.m. weekdays and 5.00 p.m. to 9.00 a.m. weekends.		-
	1.11	Blasting will be executed according to relevant regulations in Vietnam i.e. the Department of Industry and Trade in Ba Ria-Vung Tau province.		-
	1.12	Local authorities will be informed about the time of blasting rock, where necessary.		-
	1.13	Minimum safety distances, 300 m for human receptors, and 200 m for equipment, will be maintained from blasting activities		-

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4 MONITORING

4.1 LSP HSSE TEAM

A noise and vibration monitoring plan has been developed to track the effectiveness of the mitigation measures during construction. Details of LSP's monitoring plan are provided in Chapter 7 of LSP's Construction Health, Safety and Environment Management Plan (ref: LSP-1S01-005).

LSP may request additional monitoring if the monitoring programme records exceedances of the applicable noise and vibration standards.

4.2 CONTRACTORS TEAM

In order to assess the effectiveness of the mitigation / management measures and identify the need for further action, the contractors noise and vibration monitoring programme outlined in **Error! Reference source not found.** will be followed.

Should the monitoring programme note any non-compliances with the MP, corrective action will be taken to ensure the relevant activity returns to compliance in a timely manner and that any corrective action is appropriate and effective. Any corrective actions undertaken must be recorded on the daily report against the relevant activity.

Note to contractor: Delete rows that are not applicable or outside of your control and, in the second column, only include the reference to relevant mitigation / management measures. Insert the name of the responsible party from Table 2-1 for each of the separate monitoring requirements.




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Table 4.1 Monitoring Programme


Aspect, Potential Impact / Issue	Reference of Relevant Mitigation Measure *	Sampling Location	Sampling Parameters	Sampling Frequency	Applicable Standards	Responsibility	Reporting
Noise Impact from Construction Equipment/Machineries	1.1	Northern Project boundary, North-eastern Project boundary, Eastern Project boundary	Visual inspection of installed acoustic barriers to establish that they are structurally sound and located in the correct place to remain effective	Once at time of installation, and weekly thereafter or on receipt of a noise complaint	N/A – based on visual assessment		Weekly (refer to Annex D for report example)
		Four stations (K1, K2, K3 and K4) at sensitive receptors outside Project boundary.	Leq (1-hr) Leq (24-hr) Ldn Lmax Background noise(L90)	Once every 6 months (each monitoring round will be carried out continuously for 48 hours).	QCVN 26:2010/BTNMT National Technical Regulation on Noise 2007 IFC General EHS Guidelines (Noise 1.7)		To be included in the respective weekly report
		Two stations 1: outside of the Project, residential hamlet No. 2 near Ben Da port 2: outside of the Project, near Mang Ca lake	Leq (1-hr)	Once every 6 months, every day during rock blasting.	-QCVN 26:2010/BTNMT National Technical Regulation on Noise -2007 IFC General EHS Guidelines (Noise 1.7)		To be included in the respective weekly report
	1.3, 1.4, 1.5, 1.6, 1.8	Vehicles and construction equipment under contractors control	Visual inspection	Weekly (refer to Annex D for report example)	Noise levels only to be monitored on receipt of a noise compliant		Weekly (refer to Annex D for report example)
	1.2	Construction site area	Visual inspection prohibited	Weekly (refer to Annex D for report	N/A – based on visual assessment		Weekly (refer to Annex D for

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Aspect, Potential Impact / Issue	Reference of Relevant Mitigation Measure *	Sampling Location	Sampling Parameters	Sampling Frequency	Applicable Standards	Responsibility	Reporting
Vibration Impact during the Construction Phase			construction hours	example)			report example)
	1.7	Machine platform under contractors control	Analysis of concrete and strength development design prior to installation	Once prior to foundation installation	N/A		Laboratory report and design drawings
	1.9	Construction site	Visual inspection	Weekly during piling activities	N/A – based on visual assessment		Weekly (refer to Annex D for report example)
	1.10	Impact or impulse tools under the contractors control	Visual inspection during hours when use of impact or impulse tools are prohibited	Weekly or receipt of compliant	N/A – based on visual assessment		Weekly (refer to Annex D for report example)
	1.11	Blasting areas under the contractors control	Visual inspection of blasting activities in accordance with relevant regulations (QCVN 02:2008/BCT)	During blasting activities	Department of Industry and Trade in Ba Ria-Vung Tau province		Signed inspection form that details the requirements and shows guidelines were followed
	1.12	Areas of blasting rock activity under the contractors control	Local authorities informed	During blasting rock activities	N/A – based on communication with local authorities		Copies of correspondence
	1.13	Construction site	Visual inspection to ensure safety distances are adhered to	Daily on day of blasting	N/A – based on visual assessment		Drawings depicting safety zones, signed on date of blasting to confirm exclusion area is clear

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Aspect, Potential Impact / Issue	Reference of Relevant Mitigation Measure *	Sampling Location	Sampling Parameters	Sampling Frequency	Applicable Standards	Responsibility	Reporting
	1.7, 1.8, 1.9, 1.10, 1.11, 1.12, and 1.13	Four stations (K1, K2, K3 and K4) at sensitive receptors outside Project boundary.	Peak Particle Velocity Frequency	Once a month throughout the construction phase (each monitoring round will be carried out continuously for 48 hours)	QCVN 27:2010/BTNMT National Technical Regulation on Vibration		To be included in the respective weekly report

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5 AUDITING AND REPORTING

An Auditing and Reporting Programme is required to ensure that the mitigation / management measures are appropriate in controlling the identified noise and vibration impacts.

5.1 LSP HSSE TEAM

To ensure compliance with the requirements of this Noise and Vibration MP, internal inspections and audits will be undertaken by LSP. The LSP auditing and reporting programme is shown in Chapter 9 of the LSP Construction Health, Safety and Environment Management Plan (ref: LSP-1S01-005).

5.2 CONTRACTORS TEAM

The programme will comprise of the following:

- Internal Audit and Reporting Programme to be undertaken by the contractor's EHS Officer; and
- External Audit and Reporting Programme, to be conducted by the LSP's representative.

The scope of the internal auditing and reporting programme to be undertaken by the contractor is shown in **Error! Reference source not found.**

Note to contractor: In the second column, only include the reference to relevant mitigation / management measures. Ensure the job title for the responsible party is correct for your organisation.



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Table 5.1 Auditing and Reporting Programme

Inspection / Auditing Interval	Reference of Relevant Mitigation Measure*	Responsibility	Scope of Inspection / Audit	Report Submission / Record Keeping
Review of Concrete and strength development Laboratory report (Internal)	1.7	Contractor's Onsite EHS Officer	Review of Concrete and strength development Laboratory report prior to installation to ensure foundations for machine platforms will be constructed with high quality concrete	Archive Concrete and strength development Laboratory report for external auditing Concrete and strength development laboratory report to be maintained at the project site for as long as the Contractor is working at the site
Daily Inspection (Internal)	1.11, 1.12, 1.13	Contractor's Onsite EHS Officer	Review the submitted correspondence and drawings before blasting activities occur to ensure exclusion areas are clear and safety distances are adhered. Ensure requirements are adhered to during blasting activities and complete inspection form	Archive correspondence, drawings and signed inspection form in an orderly manner for external auditing Correspondence, drawings and signed inspection forms are to be maintained at the project site for as long as the Contractor is working at the site
Weekly Inspection (Internal)	1.1, 1.2, 1.3, 1.4, 1.5, 1.6, 1.8, 1.9, 1.10	Contractor's General Manager	A weekly report is to be provided to the Contractor's Onsite General Manager, which is to include: the compliance status of relevant operations that may give rise to noise and vibration impacts; identifying any non-compliances that have arisen over the previous week; detailing the corrective actions that have been taken when a failure has been noted; and noting the appropriateness and effectiveness of any corrective actions	Archive Weekly Report in an orderly manner for external auditing All reports are to be maintained at the project site for as long as the Contractor is working at the site
Biannual Inspection (External)	1.1, 1.2, 1.3, 1.4, 1.5, 1.6, 1.7, 1.8, 1.9, 1.10, 1.11, 1.12, 1.13	LSP's Representative	LSP's Representative will review the Contractor's onsite activities to assess compliance with the management plan and review all records of the Contractor's internal audit programme to review historic compliance and the use of appropriate corrective actions	A copy of the External Audit Report is to be provided to the Contractor for reference and, where necessary, implementation of any identified corrective actions All reports are to be maintained at the project site for as long as the subcontractor is working at the site


* See Table 3-1 for mitigation measure.

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ANNEX A – CONSTRUCTION SCHEDULE FOR THE SOURCES OF NOISE AND VIBRATION

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[Note to contractor: Contractor to insert Gantt chart of construction schedule in Microsoft Project Office format in Annex A]

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ANNEX B – NOISE AND VIBRATION STANDARDS

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QCVN 27:2010/BTNMT National Technical Regulation on Vibration:

Time of Application	QCVN 27:2010	
	Construction Sources	Other Sources
Daytime: 06:00 – 21:00	75	70
Night time: 21:00 – 6:00	Baseline level	60


IFC General EHS Guidelines (1.7): Noise provides recommended ambient noise level and control measures (2007):

Area	Maximum Allowable Noise Level (1 hour) ^(a) dB(A)	
	Daytime 0700 – 2200 hours	Night-time 2200 – 0700 hours
Residential, institutional, educational	55	45
Industrial/commercial areas	70	70

Note: Noise impacts should not exceed the levels presented in this table, or result in a maximum increase in background levels of 3dBA at the nearest receptor location off-site.

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ANNEX C – EMPLOYEE CONTACT DETAILS ASSOCIATED WITH MANAGEMENT PLAN

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Role	Responsibilities	Contact Details*
General Manager (Contractor)		Mobile Number: Email:
Senior Site Engineer (Contractor)		Mobile Number: Email:
Site Supervisor / Foreman (Contractor)		Mobile Number: Email:
Site EHS Officer (Contractor)		Mobile Number: Email:
Emergency Response Co-ordinator (Contractor)		Mobile Number: Email:
[Other]		
[Other]		

*Any change in respect to employees, the contact details will need to amended as soon as the role has been reassigned.

[Note to Contractor: Insert a description of the responsibilities of each role, with regards to the management of EHS and Noise and Vibration. Delete roles that are not appropriate. Include additional roles where required.]

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ANNEX D – WEEKLY REPORTING FORM

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[Note to contractor: The below table provides an example of the details to be included on a Weekly Reporting Form.]

Date of Observation	Contact Details / Role of Individual Reporting the Emissions	Details of Observation / Location	Mitigation Action to be Taken	Date Mitigation Action was Implemented