Noise and Vibrat	tion						
Document	Revision	Date	Description		Au	uthor	Approved
Control	4	30/11/2016	Revised to reflect contract Acronym "PC" refers to "I	tual arrangements for construction. Principal Contractor"	SL	S/SL	JS
Background		tion and Demolition N e Clyde Terminal Co		ement Plan (NVMP) is one of the En	vironmental Plans under the En	vironmental	Management
Objectives	Ensu	re compliance with re	levant legislative and othe	acts and minimise and manage poten er requirements including the DC con S) Report; and Environment Protectio	ditions, mitigation measures in t		
Performance Criteria	demo • Carry • Work • Austr	blition and construction out all reasonable a s and monitoring (if r	n; nd feasible measures to m equired) would be underta	ommunity / surrounding businesses / inimise noise and vibration generate ken in accordance with the <i>Interim</i> N ANZEC, 1990) <i>Technical Basis for G</i> e	d during demolition and constru- loise Construction Guideline ICN	ction; NG (DECC, 2	2009);
Key Performance Indicators		omplaints raised by th ruction.	ne community / surroundin	g businesses / stakeholders with reg	ards to noise and vibration emis	sion in relat	ion to demolition ar
Legislative	Developmen	nt Consent SSD 5	147 [14 January 201	5]			
Requirements	Operation of Plant and Equipment	(a) maintained in a	t shall ensure that all plan proper and efficient cond roper and efficient manne		oment is:		
	Hours of Work		shall comply with the hou ion, Demolition & Operation	rs detailed in Table 2, unless otherwi on Hours	se agreed in writing by the EPA	and the Se	cretary.
			Activity	Day	Т	ime	
		Construct	on and Demolition	Monday – Friday	7:00am	to 6:00pm	
				Saturday	8:00am	to 5:00pm	
			Operation	Monday – Sunday	24	hours	

Noise and Vibration	
Hours of works	 C23. Construction and demolition outside of the hours identified in condition C22 may be undertaken in the following circumstances: (a) works that are inaudible at the nearest sensitive receivers; (b) works that are consistent with Viva Energy's existing maintenance procedures and are in accordance with the EPL; (c) other works agreed to in writing by the EPA or the Secretary; (d) for the delivery of materials required outside these hours by the NSW Police Force or other authorities for safety reasons; or (e) where it is required in an emergency to avoid the loss of lives, property and/or to prevent environmental harm.
Construction and Demolition Noise Management Plan	 C25. The Applicant shall prepare and implement a Noise Management Plan for construction and demolition. The plan shall: (a) be prepared and implemented by a suitably qualified and experienced expert, (b) be prepared in consultation with the EPA; (c) be approved by the Secretary prior to the commencement of construction or demolition; (d) describe the measures that will be implemented to minimise noise from construction and demolition including: all reasonable and feasible measures being employed on site; maintenance of equipment to ensure that it is in proper and efficient condition; procedures to ensure that all construction and demolition equipment does not operate simultaneously, where practicable; traffic noise is effectively managed; identification of high noise generating construction and demolition works, including proposed times when these works will be carried out, respite periods and mitigation measures, including the use of temporary noise barriers where necessary; comply with the relevant conditions of this consent; (e) includes a noise monitoring program that: is capable of evaluating noise impacts from construction and demolition; includes a protocol for determining exceedances of the relevant noise criteria; and includes procedures for responding to complaints.
Blasting Hours	C26. The Applicant shall only carry out blasting on site between 9:00am and 5:00pm Monday to Friday inclusive. Blasting is not permitted on Sundays, public holidays or at any other time without the written approval of the Secretary.

Noise and Vib	ration	
	Blast Management Plan	 C27. The Applicant shall prepare and implement a Blast Management Plan for demolition to the satisfaction of the Secretary. This plan must: (a) be prepared by a suitably qualified and experienced expert (b) be prepared in consultation with the EPA; (c) be approved by the Secretary prior to the commencement of blasting; (d) describe the program for undertaking test blasts to determine appropriate blasting parameters to ensure compliance with the limits in this consent. (e) describe the measures that would be implemented to: ensure compliance with the blasting limits in this consent; protect the safety of people in the surrounding area; protect public and private infrastructure and property in the surrounding area from any damage; and minimise the dust and fume emissions of any blasting; and (f) include a monitoring program for evaluating and reporting on compliance with the blasting limits in this consent; and (g) describes the procedures for early notification to the public, nearby businesses and relevant authorities of proposed blasting times, duration and any required exclusion areas and/or road closures.
	Environment	Protection Licence EPL 570 [21 May 2015]
	O2 Maintenance of Plant and Equipment	 O2.1 All plant and equipment installed at the premises or used in connection with the licensed activity: (a) must be maintained in a proper and efficient condition; and (b) must be operated in a proper and efficient manner.
Activities	Demolition or co Excave Trucks Crane Air cor Pneun Cutting	

Noise and Vibrat	ion
Predicted Impacts	 The demolition and construction works may result in minor exceedances of construction noise management levels of up to 4 dB(A) at three residential receivers. This predicted outcome is based on a conservative assumption that all plant / machinery / equipment is operating simultaneously, which is unlikely to be the case in practice. The mitigation measures and management procedures contained in this NVMP are adequate in reducing the predicted construction noise impacts and minimising disturbance to residences. Demolition blasting is anticipated to comply with the relevant criteria.
	 Traffic noise from demolition and construction vehicles is predicted to increase existing noise levels by less than 2 dB(A), representing a minor impact. Construction vibration impacts for surrounding receivers are considered to be highly unlikely, and blasting impacts are also predicted to be minimal. The only specific noisy activity likely to impact on sensitive receivers is blasting as shown in Figure D-3A below. All other works are considered general construction and demolition works with minimal to no impact on sensitive receivers. The requirements for managing noisy activities, location and mitigation measures associated with these works, will be included in the Blast Management Plan.
Sensitive Receivers	 The primary sensitive receivers associated with the Clyde Terminal are commercial receivers located adjacent to the Site and residences located greater than 400m from the Site. The Site is adjacent to commercial and industrial receivers on all sides, although Parramatta River and Duck River separate the Site from receivers to the south and east. The nearest residential receivers are located approximately 400m to the north-east, 1.1km to the south-east, 600m to the south and 800m to the west. Figure D-3A illustrates the location of the nearest sensitive receivers in relation to the Project.

				Implementation Responsibility				
				Constru	uction	Demolition		
Plan Reference	Source Reference	e Aspect Mitigation Measure	Viva Energy as PC	Contractor as PC	Contractor as PC	Frequency		
NVMP1	B11 EPL 570 O2.1	Equipment	All plant and equipment used will be : - maintained in a proper and efficient condition; and - operated in a proper and efficient manner.	Construction Project Managers (requirements communicated via the Project HSSE Plan)	Saunders Project Manager	Liberty Industrial Project Manager	At all times	
NVMP2	EIS, NV1 C25 (d)	Demolition and Construction noise	All reasonable and feasible measures will be employed on Site to minimise noise from demolition and construction.	Construction Project Managers (requirements communicated via the Project HSSE Plan)	Saunders Project Manager	Liberty Industrial Project Manager	At all times	
NVMP3	EIS, NV2 C22	Hours of work	Hours of works will be to between 7am and 6pm Monday to Friday and 8am to 5pm Saturday	Construction Project Managers (requirements communicated via the Project HSSE Plan)	Saunders Project Manager	Liberty Industrial Project Manager	At all times	
NVMP4	C23 (a)	Hours of work	Where Works are required to be undertaken outside the hours of work in NVMP3 and is in accordance with MCoA23 (a), the Contractor shall complete an Out of Hours Approval Request Form (See Appendix D-3A) and submit to the Clyde Terminal Conversion Project Manager. Viva Energy will request permission from NSW Department of Planning and advise the Contractor if permission has been granted.	Construction Project Managers (requirements communicated via the Project HSSE Plan)	Saunders Project Manager	Liberty Industrial Project Manager	One week prior to out hours work	

		Noise an	d Vibration - Mitigation Measures				
		1			Implementatior	Responsibility	/
				Constr	uction	Demolition	
Plan Reference	Source Reference	Aspect	Mitigation Measure	Viva Energy as PC	Contractor as PC	Contractor as PC	Frequency
NVMP6	C23 (c) EIS NV3	Hours of work	Work undertaken outside the hours of work detailed in NVMP3 and which has the potential to be audible at residential properties will require the Contractor to complete an Out of Hours Approval Request Form (See Appendix D-3A) and submit to the Clyde Terminal Conversion Project Manager. Viva Energy will seek agreement of the EPA or DPE.	Construction Project Managers (requirements communicated via the Project HSSE Plan)	Saunders Project Manager	Liberty Industrial Project Manager	One month prior to out of hours work.
NVMP7	C23	Hours of work	Deleted (same as NVMP6)	N/A	N/A	N/A	N/A
NVMP8	EIS, NV6	Work planning	SimOps meetings will review plans for noisy activities and where practicable coordinating of the potential for cumulatively noisy activities.	Clyde Terminal	Conversion Proj	ect Manager	Weekly
NVMP9	EIS, NV7 EIS, NV8 EIS, NV9	Plant and equipment	All plant items should be properly maintained and operated according to manufacturers' recommendations in such a manner as to avoid causing excessive noise. This includes the use and maintenance of noise attenuation equipment such as silencers, mufflers and/or acoustic enclosures where practicable.	Construction Project Managers (requirements communicated via the Project HSSE Plan)	Saunders Project Manager	Liberty Industrial Project Manager	At all times
NVMP10	EIS, NV11	Monitoring	Noise monitoring at sensitive locations in the event of noise complaints being assessed with appropriate action taken.	Clyde Terminal	Conversion Proj	ect Manager	As required by complaint

	Noise and Vibration - Mitigation Measures						
				-	mplementation	Responsibility	/
				Constru	uction	Demolition	
Plan Reference	Source Reference	Aspect	Mitigation Measure	Viva Energy as PC	Contractor as PC	Contractor as PC	Frequency
NVMP11	C27 (e)	Blast Management Plan	 A Blast Management Plan will be developed to: describe the program for undertaking test blasts to determine appropriate blasting parameters to ensure compliance with the limits in this consent. control measures to minimize the impact of ground vibration and noise as a result of blasting and:. protect the safety of people in the surrounding area; protect public and private infrastructure and property in the surrounding area from any damage; and minimise the dust and fume emissions of any blasting. Include a monitoring program for evaluating and reporting on compliance with the blasting criteria in NVMP14; and describes the procedures for early notification to the public, nearby businesses and relevant authorities of proposed blasting times, duration and any required exclusion areas and/or road closures. 	N/A	N/A	Liberty Industrial Project Manager	One month prior to commenceme nt of blasting
NVMP12	C27 (a), C27 (b) C27 (c)	Blast Management Plan	The Blast Management Plan will be prepared by a suitable qualified and experienced expert and submitted to the Demolition Manager for coordination of consultation with the EPA and approval of DPE.	N/A	N/A	Liberty Industrial Project Manager	One month prior to commenceme nt of blasting
NVMP13	C26	Blasting Hours	The Blast Management Plan will include restrictions on blasting on site to between 9:00am and 5:00pm Monday to Friday inclusive. Blasting is not permitted on Sundays, public holidays or at any other time without the written approval of the Secretary. The Blast Management Plan will include a process for advising the Demolition Manager when blasting is required outside these requirements.	N/A	N/A	Liberty Industrial Project Manager	One month prior to commenceme nt of blasting

	Noise and Vibration - Mitigation Measures								
				Implementatior	Responsibility	/			
				Constr	uction	Demolition			
Plan Reference	Source Reference	Aspect	Mitigation Measure	Viva Energy as PC	Contractor as PC	Contractor as PC	Frequency		
NVMP14	C27	Blast Management Plan	 The Blast Management Plan will be prepared to ensure that blasting on the site does not cause exceedances of the following criteria at any sensitive receiver. Airblast overpressure level: 115dB (Lin Peak) at any time, 120dB (Lin Peak) Allowable exceedance (5% of the total number of blasts over a 12 month period) Ground vibration peak particle velocity: 5mm/sec at any time 10mm/sec Allowable exceedance (5% of the total number of blasts over a 12 month period) <i>Notes:</i> Error margins associated with any monitoring equipment used to measure this are not to be taken into account in determining whether or not the limit has been exceeded. Instrumentation used to measure and record the airblast overpressure and ground vibration levels must meet the requirements of Australian Standard AS 2 187.2-2006. The airblast overpressure and ground vibration levels in Table 3 do not apply at sensitive receivers that are owned by the Applicant or subject to a private agreement, relating to airblast overpressure and ground vibration levels, between the Applicant and land owner 	N/A	N/A	Liberty Industrial Project Manager	One month prior to commencement nt of blasting Restrictions apply at all times		
NVMP15	C27 (a), C27 (b)	External approvals for Blast Management Plan	The Demolition Manager will obtain DPE's approval for the Blast Management Plan, in consultation with the EPA	N/A	N/A	Liberty Industrial Project Manager	As required		

		Noise and	Vibration - Mitigation Measures				
					Implementatior	Responsibility	/
				Construction		Demolition	
Plan Reference	Source Reference	Aspect	Mitigation Measure	Viva Energy as PC	Contractor as PC	Contractor as PC	Frequency
NVMP16	C27	External approvals for blasting outside prescribed hours	The Demolition Manager will obtain DPE's approval of the Secretary for blasting outside the hours prescribed in NVMP 13 .	N/A	N/A	Liberty Industrial Project Manager	Senior Project Manager - Demolition Contractor
NVMP17	EIS, NV13 EIS, NV14 EIS, NV15 EIS, NV16 EIS, NV17 EIS, NV18 EIS, NV19 EIS, NV20 EIS, NV21 EIS, NV22	Blast Management Plan	 Other items that are to be considered in the Blast Management Plan are: Reducing maximum instantaneous charge, for example by reducing blasthole diameter or deck loading; Using a combination of appropriate delays; Allowing for excessive humps or toe in the blast design; Optimising blast design by altering drilling patterns, delaying layout or altering blasthole inclination from the vertical; Exercising strict control over the location, spacing and orientation of all blastholes and using the minimum practicable sub-drilling that gives satisfactory to conditions; and Establishing times of blasting to suit the situation; Using a series of test blasts to be used to determine site specific conditions. As a result of these tests the maximum instantaneous charge should be determined; Restricting blasting or ceasing blasting if the predictions indicate that air blast overpressure levels are likely to be exceeded at neighbouring dwellings unless agreed with the owner(s); 	N/A	N/A	Liberty Industrial Project Manager	One month prior to commenceme nt of blasting

		Noise and	Vibration - Mitigation Measures		Responsibility	1	
				Constr			
Plan Reference	Source Reference	Aspect	Mitigation Measure	Viva Energy as PC	Contractor as PC	Contractor as PC	Frequency
NVMP18	EIS, NV23 EIS, NV24 EIS, NV25 EIS, NV26 EIS, NV27 EIS, NV28 EIS, NV29 EIS, NV30 EIS, NV31 EIS, NV32 EIS, NV33 EIS, NV34	Blast Management Plan	 Ensuring all reasonable attempts are made to contact sensitive receivers located within 500 m of a blast location; Using linear enclosures or shielding will be used to assist in airblast attenuation if required; Ensuring stemming type and length is adequate; Eliminating exposed detonating cord and investigating alternative initiation method; Making extra efforts to eliminate the need for two shots (e.g. better control of drill patterns); Using survey methods, as appropriate, to ensure burden is adequate; Blasting to be completed only during an appropriate clear weather window; Allowing for the effects of temperature inversion and wind speed and direction on the propagation of airblast to surrounding areas; Orientating faces where possible so that they do not directly face residences; Varying the direction of initiation; Exercising strict control over the burden, spacing and orientation of all blastholes; Taking particular care where the face is already broken or where it is strongly jointed, sheared or faulted; 	N/A	N/A	Liberty Industrial Project Manager	One month prior to commenceme nt of blasting
NVMP19	EIS, NV35 EIS, NV36	Noise and vibration from blasting	 Considering deck loading where appropriate to avoid broken ground or cavities in the face (e.g. from back break); Adequately monitoring the blasts to help minimise complaints and also to provide documentation in the event of any claims for damages arising from blasting. 	N/A	N/A	Liberty Industrial Project Manager	One month prior to commenceme nt of blasting

		Noise and	l Vibration - Mitigation Measures				
					Implementation	Responsibility	/
				Constr	uction	Demolition	
Plan Reference	Source Reference	Aspect	Mitigation Measure	Viva Energy as PC	Contractor as PC	Contractor as PC	Frequency
NVMP20	EIS, NV37	Noise and vibration from blasting	Recording of complaints associated with blasting, identifying the nature of the complaint, the particular operation that initiated the complaint, and documenting action taken.	N/A	N/A	Liberty Industrial Project Manager	As required
NVMP21	EIS, NV4 EIS, NV5 EIS, NV6 EIS, NV10	Complaints Management	If monitoring of noise (upon complaints) identifies exceedances above those predicted in the EIS and it is determined that these are as a direct result of demolition and/or construction activities the following mitigation measures will be investigated to determine effective management of the issue:	N/A	N/A	Liberty Industrial Project Manager	As required
			 restrictions to construction hours (beyond the above hours) where noise impacts are significant; 				
			 restrictions to the amount of construction or demolition equipment used simultaneously; 				
			 construction of noise bunds or barriers, where feasible and effective for noise suppression, at the early demolition and construction stage; 				
			 use of temporary barriers for stationary noisy equipment; 				
			 consultation with property owners likely to be affected prior to works being carried out; and 				
			 review of equipment type, use and simultaneous operation. 				

Demolition and Construction Noise and Vibration Management Plan

Aspect	Description	Responsibility	Frequency
Complaints	Complaints register maintained in accordance with Section 3.3 of the EMS	Clyde Terminal Operations Manager Liberty Industrial Project Manager (as applicable to area of control)	Ongoing, as required
Noise monitoring following complaint	Noise monitoring will be undertaken at the sensitive receivers identified in the EIS if a noise complaint is received.	Clyde Terminal Operations Manager Liberty Industrial Project Manager (as applicable to area of control)	Upon receipt of a noise complaint
Noise monitoring for Out of Hours works – if potentially audible at sensitive receivers	 Boundary noise monitoring will be undertaken should construction or demolition works be required to be undertaken outside the allowed hours of work in accordance with mitigation measure NVMP6. The frequency of the noise monitoring will be determined to assess that the noise would not provide additional impacts at these receivers. Normal construction hours are defined as: Between 7am and 6pm Monday to Friday; and 8am to 5pm on Saturdays. Appropriate actions will be undertaken should noise levels exceed the criteria for the Project. 	Clyde Terminal Operations Manager Liberty Industrial Project Manager (as applicable to area of control)	Always

Noise and Vibration - Reporting Requirements				
Aspect	Description	Responsibility	Frequency	
Complaints	Register of complaints will be maintained and updated. Following receipt of a complaint relating to the Works, actions will be undertaken in accordance with Section 3.3 of the EMS.	Clyde Terminal Conversion Project Manager. Liberty Industrial Project Manager (as applicable to area of control)	Ongoing, as required	
Daily Log	Daily log of demolition activities undertaken to be maintained to assist with investigation of complaints.	Liberty Industrial Project Manager	Daily	

Demolition and Construction Noise and Vibration Management Plan

Noise Monitoring	Where monitoring is required a report would be provided in accordance with the ICNG (DECC June 2009) that provides:	Clyde Terminal Conversion Project Manager	As required in response to
	 the type of monitoring conducted (for example, at a particular project stage or following complaints) and a brief statement of the measurement method the noise/vibration/blasting conditions on the consent/licence, or the relevant noise management objectives descriptions of the nearest affected residences and other sensitive land uses or, in the case of complaints, description of the complainant location and complaint plan or diagram showing the location of the monitoring and the noise generating works description of the instrumentation used (the instrumentation specifications required for compliance noise monitoring are the same as those required for background noise monitoring set out in Appendix B of the NSW Industrial Noise Policy (EPA 2000)) name and relevant qualifications or professional memberships of monitoring personnel the weather conditions during monitoring the time(s) and duration(s) of monitoring, including dates – in the case of complaints a clear description of the construction activities taking place during the monitoring the results of monitoring at each monitoring location, including a comparison with the consent conditions or relevant noise management objectives a clear statement outlining the project's compliance or non-compliance with the conditions or objectives where the monitored level is higher than the conditions or objectives, the reasons for non-compliance should be stated, strategies for minimising noise identified and stated, and the appropriate actions to implement the strategies. 	Liberty Industrial Project Manager (as applicable to area of control)	complaints
Blast monitoring	In accordance with the EPA requirements, report on assessment of the effectiveness of the environmental controls proposed for Blasting.	Liberty Industrial Project Manager	Blasting

Noise and Vibration - Corrective Action				
Aspect	Description	Responsibility	Frequency	
Complaints in relation to demolition / construction emissions	Review demolition / construction activities. Modify methods to reduce noise or vibration emissions as required.	Clyde Terminal Conversion Project Manager Liberty Industrial Project Manager (as applicable to area of control)	Ongoing, as required	

Figure D-3 A – Noise and Vibration Sensitive Receivers



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Appendix D-3A – Out of Hours Approval Notification Form

About this form	Work undertaken outside the approved hours of work (between 7am and 6pm Monday to Friday and 8am to 5pm Saturday) and which has the potential to be audible at residential properties will require the Contractor to advise the Demolition Manager or Construction Manager and complete an Out of Hours Approval Form for the agreement of the EPA or DPE.				
Project Phase:	Construction	Demo	lition 🗌		
Contractor:		Date:			

Temporary After Hours Work

l

Description of proposed after hours works required (include plant and equipment to be used and attach a map of location)				
Location description:				
Proposed after hours times:				
Proposed start date:				
Proposed duration:				

Proposed Noise Mitigation Measures

Approved by:					
Signature:		Date:			

Noise Monitoring Required

Approved by:				
Signature:		Date:		

Agreement of the EPA or Secretary of Department of Planning and Environment

Officer's name:				
Agency:	EPA	DPE	Date:	

Attach email correspondence as evidence of EPA's or DPE's agreement

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