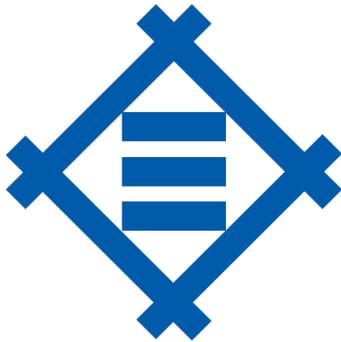


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mitsui E&P
Australia

Waitsia Gas Project Stage 2: Management of Flaring

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TERMS AND DEFINITIONS

Term	Definition
Standard API 537	<i>Flare Details for Petroleum, Petrochemical, and Natural Gas Industries</i>
Flare Stack	An elevated vertical pipe used so that ignition and combustion of gas takes place at a considerable height predominately for safety purposes.
Irwin Park Farm	Farming property in the Waitsia Gas Project Stage 2 Development Envelope owned by MEPAU
MEPAU	Mitsui Exploration & Production Australia AWE Perth Pty Limited is the legal entity, operator of the relevant Production Licenses (L1 and L2), the proponent for the Waitsia Gas Project Stage 2 proposal and operates under the Mitsui E&P Australia (MEPAU) brand.
NEPM	National Environment Protection Measure NEPM are a special set of national objectives designed to assist in protecting or managing particular aspects of the environment (NEPC, 2020).
Non-routine flaring ¹	Non-routine flaring of gas is all flaring other than routine and safety flaring. Non-routine flaring is typically intermittent and of short duration. It is either planned or unplanned. Includes flaring during: <ul style="list-style-type: none"> • Temporary (partial) failure of equipment that handles the gas during normal operations, until their repair or replacement, e.g. failure of compressors, pipeline, instrumentation, controls; • Temporary failure of a customer's facilities that prevents receipt of the gas; • Initial plant/field startup before the process reaches steady operating conditions and/or before gas compressors are commissioned; • Startup following facility shutdowns; • Scheduled preventive maintenance and inspections; • Construction activities, such as tie-ins, change of operating conditions, plant design modifications; • Process upsets when process parameters fall outside the allowable operating or design limits and flaring is required to stabilize the process again; • Reservoir or well maintenance activities such as acidification, wire line interventions; • Exploration-, appraisal-, or production-well testing or cleanup following drilling or well work-over
Pilot flame	A pilot flame is a flame required to maintain the flare system operational in a safe and ready condition.
Routine flaring	As described by The World Bank (2020), routine flaring of gas is flaring during normal oil production operations in the absence of sufficient facilities or amenable geology to re-inject the produced gas, utilize it on-site, or dispatch it to a market.

Term	Definition
Safety flaring ¹	Safety flaring includes flaring of: <ul style="list-style-type: none"> • Gas stemming from an accident or incident that jeopardizes the safe operation of the facility; • Blow-down gas following emergency shutdown to prevent over-pressurization of all or part of the process system; • Gas required to maintain the flare system in a safe and ready condition (purge gas/make-up gas/fuel gas); • Gas required for a flare’s pilot flame; • Gas produced as a result of specific safety-related operations, such as safety testing, leak testing, or emergency shutdown testing; • Gas containing H₂S, including the volume of gas added to ensure good dispersion and combustion; • Gas containing high levels of volatile organic compounds other than methane.
ZRF 2030	The World Banks “Zero Routine Flaring by 2030” Initiative

¹ GGFR, 2016

1.0 INTRODUCTION

The Waitsia Gas Project Stage 2 (See Figure 1-1) (<http://www.epa.wa.gov.au/proposals/waitsia-gas-project-stage-2>) was referred to the EPA in August 2019. In November 2019 the level of assessment was set by the EPA at Assessment on Referral Information (ARI). This document has been compiled by Mitsui E&P Australia (MEPAU) to meet Environmental Protection Authority (EPA) requirements requested under Section 40 (2)(a) of the EP Act as part of the ARI process.

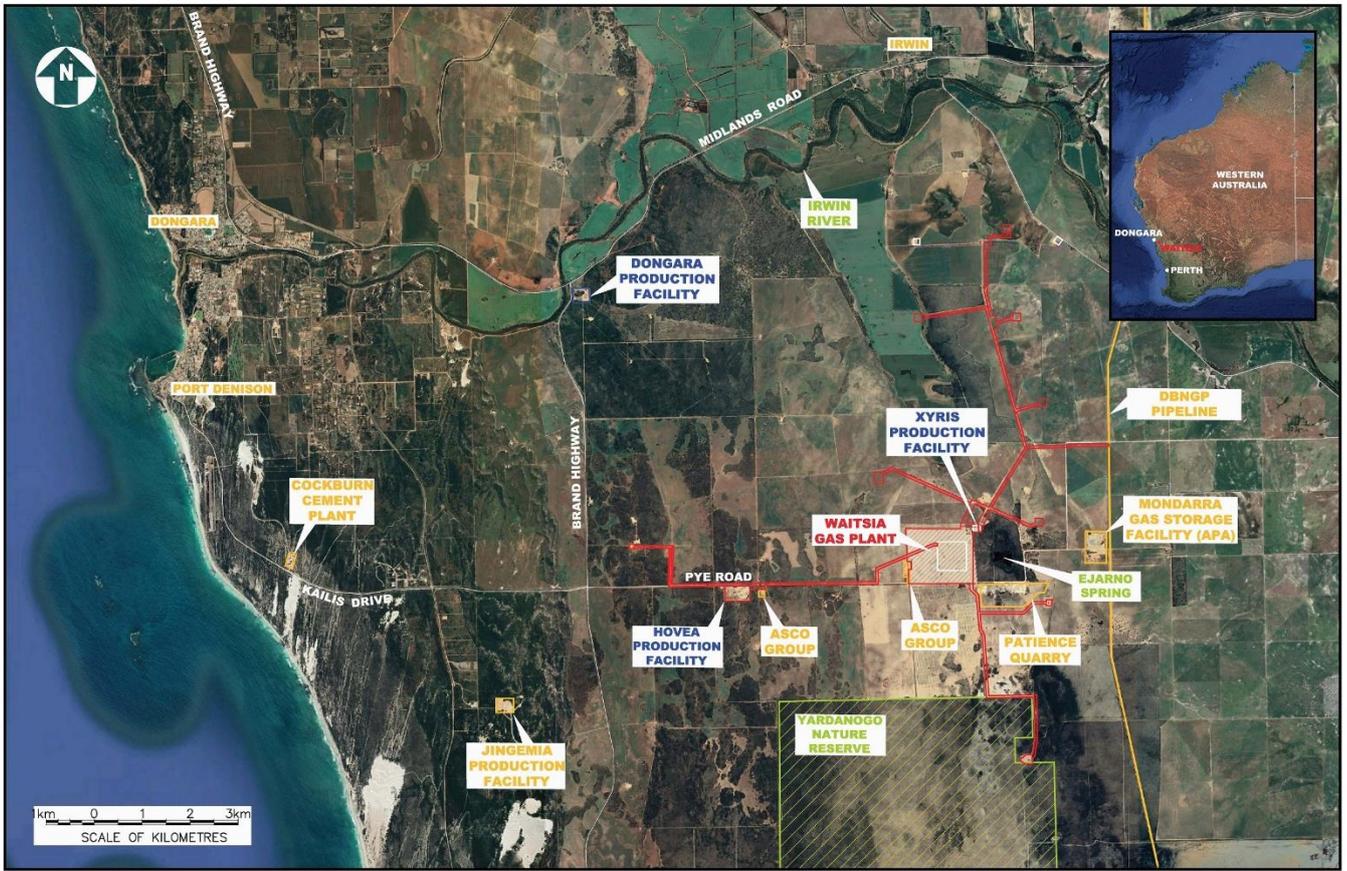


Figure 1-1 Regional Setting of the Waitsia Gas Project Stage 2

2.0 PURPOSE

The purpose of this document is to provide further details on the following:

- An outline of the management of flaring at the Waitsia Gas Plant site
- Impacts of flaring from the Waitsia Gas Plant to visual amenity
- Impacts of flaring from the Waitsia Gas Plant on air quality
- Commitment to World Banks Zero Routine Flaring by 2030 initiative and compliance with the Western Australian Government's position on routine flaring

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3.0 MANAGEMENT OF FLARING - THE WAITSIA GAS PLANT

3.1 Flare design and use

A flare system will be built at the Waitsia Gas Plant adhering to the requirements of applicable industry standards including API 537 and 521. The flare system will include:

- a flare stack that will be approximately 25m in height.
- a constant pilot flame that will be enclosed such that no flame will be visible during normal operations.
- a smokeless flame² during normal operations.
- an operating philosophy³ that mandates industry best practice of combustion or flaring instead of cold venting.

The flaring of gas is only expected to occur for safety flaring and non-routine flaring purposes, as defined in the Terms and Definitions section of the document.

3.2 Impacts of flaring on visual amenity

Given the enclosure of the pilot flame, no flame will be visible during normal plant operations. Non-routine flaring or safety flaring events that may infrequently occur will result in a flame temporarily higher than the flare enclosure. During such events the flame will be visible at the Waitsia Gas Plant however due to the selection of the plant location, the local terrain and the height of the flare, the flame is not expected to be visible at nearby sensitive receptors.

Appendix APPENDIX 1 provides:

- a plan of the distance to nearest sensitive receptors (houses on farm properties and the town site of Irwin) from the Waitsia Gas Plant flare stack, and
- line of sight plan, demonstrating distance and elevation from the sensitive receptors to the Waitsia Gas Plant flare stack.

Both safety flaring and non-routine flaring are not expected to create a significant visual amenity impact to nearby sensitive receptors, whether during day or night periods.

3.3 Impacts of Waitsia Gas Plant on air quality

As detailed in Ramboll, 2019 the impact of the operation of the Waitsia Gas Plant, including the flaring of gas will:

- complies with NEPM targets, demonstrated by modelling a normal operations and emergency operations scenarios, and
- will maintain air quality such that environmental values of the region are protected.

² Defined as being less than Ringelmann 1, as measured using methodology as per AS 3543:2014, *Use of standard Ringelmann and Australian Standard miniature smoke charts*.

³ Cold venting results in the release of methane, carbon dioxide, volatile organic compounds, sulphur compounds and gas impurities to the atmosphere. Combustion or flaring causes these gases to oxidise and form carbon dioxide, which, when compared to methane, has significantly lower global warming potential. By adopting the operating philosophy that combustion or flaring are the preferred methods of disposal of hydrocarbon during upset or abnormal operating conditions, emissions associated with this activity are reduced to as low as reasonably practicable.

4.0 ZERO ROUTINE FLARING BY 2030 (ZRF 2030) INITIATIVE

During oil production, associated gas is produced from the reservoir together with the oil. Much of this gas is utilized or conserved because governments and oil companies have made substantial investments to capture it; nevertheless, some of it is routinely flared because of technical, regulatory, or economic constraints. As a result, thousands of gas flares at oil production sites around the globe burn approximately 140 billion cubic meters of natural gas annually, causing more than 300 million tons of CO₂ to be emitted to the atmosphere (World Bank, 2020). The World Bank established the ZRF 2030 initiative to bring together governments, oil companies and development institutions who agree to cooperate to eliminate routine flaring no later than 2030.

The ZRF 2030 initiative, introduced by the World Bank, is premised on routine flaring, as described above, not being sustainable from a resource management and environmental perspective. The initiative seeks to eliminate routine flaring⁴ no later than 2030.

The Waitsia Gas Project Stage 2 proposal is consistent with the ZRF 2030 initiative in that from the initial commencement of operations routine flaring will not be undertaken.

4.1 West Australian State Government Commitment to Zero Routine Flaring

In February 2019 the West Australian Government became the first Australian jurisdiction to endorse the World Bank's ZRF 2030 initiative.

Companies operating oil fields in Western Australia are therefore required to comply with the Initiative. The Waitsia Gas Project Stage 2 proposal complies with the ZRF 2030 initiative and the Western Australian Government's commitment.

4.2 Management of Zero Routine Flaring at the Waitsia Gas Project Stage 2

The Waitsia Gas Project Stage 2 is development project that captures and processes gas for commercial production. Minor amounts of associated liquid hydrocarbons known as condensates will also be recovered at the Waitsia Gas Plant (WGP). At WGP condensate will be stabilised, stored and loaded out to tankers for road transport to Kwinana (MEPAU, 2020) or used for fuel inside the WGP.

The Waitsia Gas Project Stage 2 operation will:

- Operate a pilot flare during routine operations to ensure availability to operate as a safety flare when required (this ensures emissions from flaring are minimised),
- Not undertake routine flaring of gas, and
- Minimise non-routine and safety flaring of gas.

The Waitsia Gas Project Stage 2 is therefore in alignment with the intentions of the World Banks ZRF 2030 Initiative.

⁴ The ZRF 2030 initiative relates to routine flaring and not safety flaring, exploration testing or non-routine flaring.

5.0 REFERENCES

Global Gas Flaring Reduction Partnership (GGFR) (2016). *Gas Flaring Definitions*

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Ramboll (2019). *Waitsia Gas Project – Stage 2 – Air Dispersion Modelling* in MEPAU (2019) Mitsui E&P Australia (MEPAU) (2019). *Waitsia Gas Project Stage 2 Appendix E*

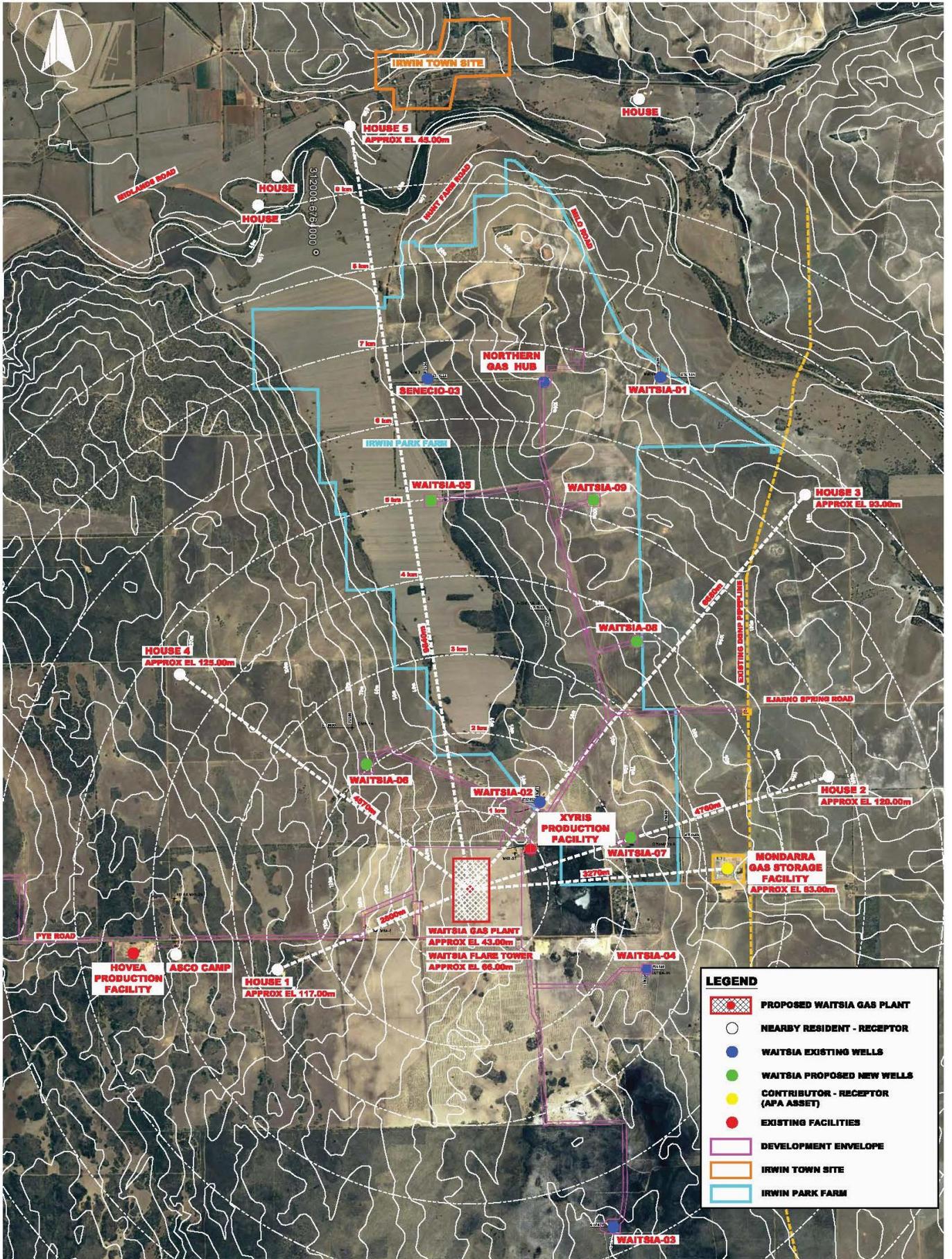
http://www.epa.wa.gov.au/sites/default/files/Referral_Documentation/Appendix%20E%20-%20Air%20Dispersion%20Modelling.pdf

The World Bank (2020) *Zero Routine Flaring by 2030*. Accessed 15 January 2020

<https://www.worldbank.org/en/programs/zero-routine-flaring-by-2030>

APPENDIX 1

Impacts of flaring on visual amenity – Distance of Waitsia Gas Plant to nearest sensitive receptors



APPENDIX 2
**Impacts of flaring on visual amenity – Line of sight - Waitsia Gas
Plant to House 1**

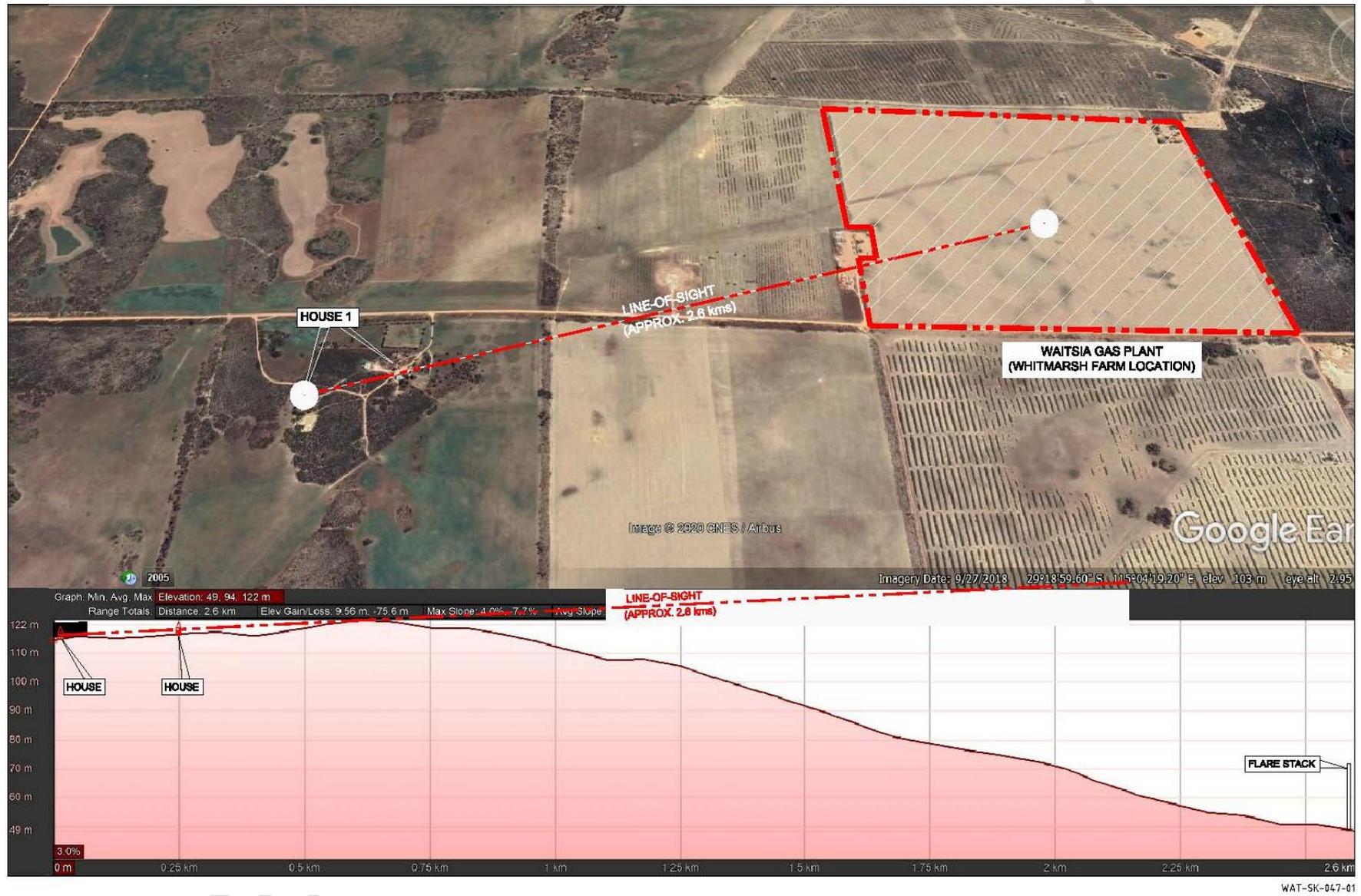


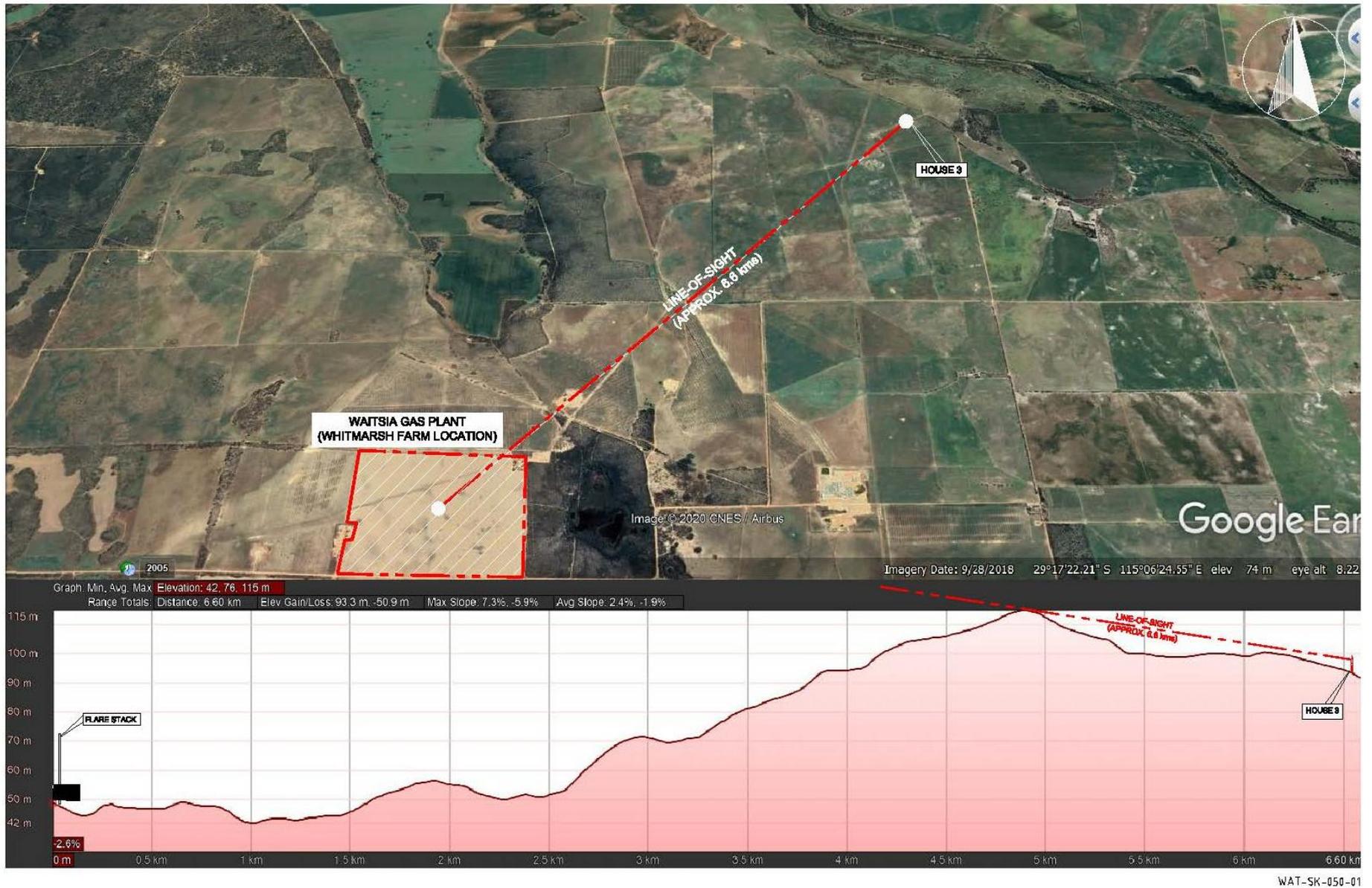
Image Source: Google Earth, 2020

APPENDIX 3
**Impacts of flaring on visual amenity – Line of sight - Waitsia Gas
Plant to House 2**



Image Source: Google Earth, 2020

**Impacts of flaring on visual amenity – Line of sight - Waitsia Gas
Plant to House 3**



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Image Source: Google Earth, 2020

APPENDIX 4
**Impacts of flaring on visual amenity – Line of sight - Waitsia Gas
Plant to House 4**

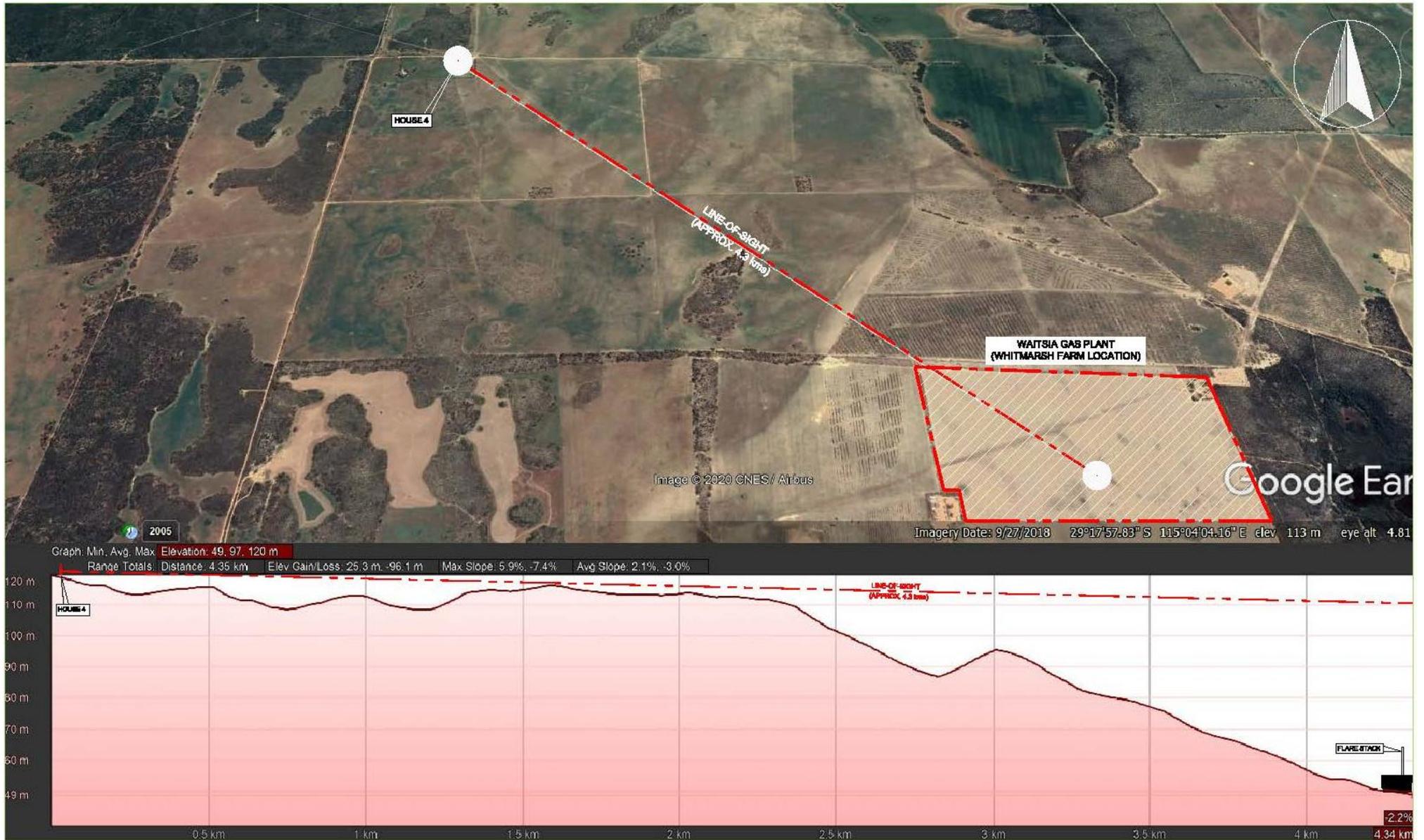
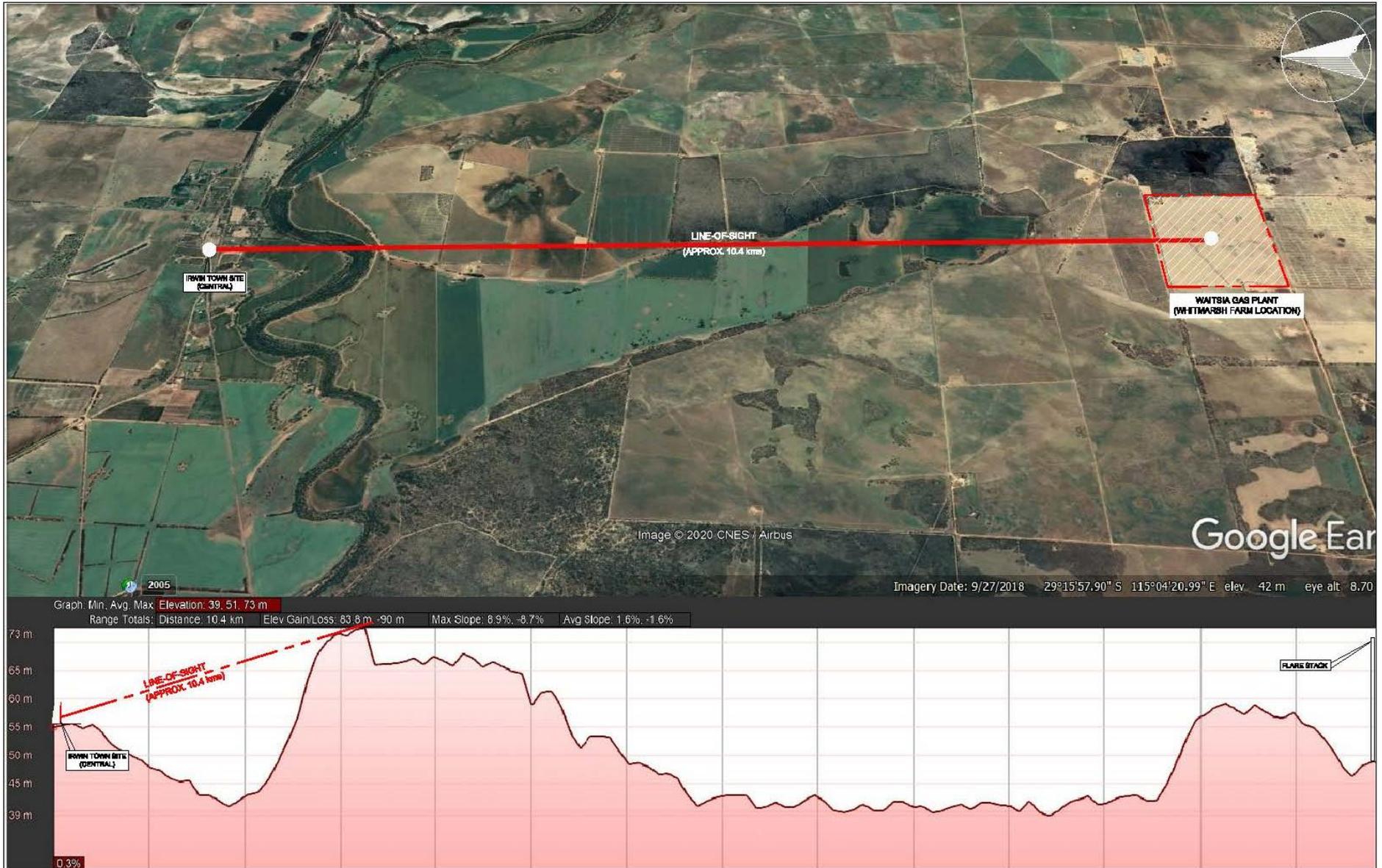


Image Source: Google Earth, 2020

APPENDIX 5

Impacts of flaring on visual amenity – Line of sight - Waitsia Gas Plant to Irwin Town Site



WAT-5K-052-01

Image Source: Google Earth, 2020

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