



Artemis Exploration Inc.

Applications for Well, Pipeline, and Facility Licences
Furness Field

January 15, 2008

ALBERTA ENERGY AND UTILITIES BOARD

Decision 2008-002: Artemis Exploration Inc., Applications for Well, Pipeline, and Facility Licences, Furness Field

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ALBERTA ENERGY AND UTILITIES BOARD

Calgary Alberta

**ARTEMIS EXPLORATION INC.
APPLICATIONS FOR WELL, PIPELINE,
AND FACILITY LICENCES
FURNESS FIELD**

**Decision 2008-002
Applications No. 1478721,
1494900, and 1494911**

1 DECISION

Having carefully considered all of the evidence, the Alberta Energy and Utilities Board (EUB/Board) hereby approves Applications No. 1478721, 1494900, and 1494911.

2 INTRODUCTION

2.1 Applications

Artemis Exploration Inc. (Artemis) submitted three applications related to a proposed well located at Legal Subdivision (LSD) 15, Section 10, Township 48, Range 23, West of the 4th Meridian, to a projected bottomhole in the same location (15-10 well). The first application (Application No. 1478721) was submitted in accordance with Section 2.020 of the *Oil and Gas Conservation Regulations (OGCR)* for a licence to drill and operate the 15-10 well. The maximum hydrogen sulphide (H₂S) concentration expected to be encountered in the well would be about 1.2 moles per kilomole (mol/kmol) (0.12 per cent), and the cumulative drilling H₂S release rate would be 0.0084 cubic metres per second, with a corresponding emergency planning zone (EPZ) of 120 metres (m). The purpose of the well would be to obtain gas production from the Lower Mannville Formation.

The second application (Application No. 1494900) was submitted in accordance with Part 4 of the *Pipeline Act* for approval to construct and operate a pipeline for the purpose of transporting natural gas from the proposed well at LSD 15-10-48-23W4M to an existing pipeline tie-in point at LSD 7-10-48-23W4M. The proposed pipeline would be about 720 m in length, with a maximum outside diameter of 88.9 millimetres and would transport natural gas with a maximum H₂S concentration of 4.00 mol/kmol (0.4 per cent).

The third application (Application No. 1494911) was submitted in accordance with Section 7.001 of the *OGCR* for approval to construct and operate a single-well gas battery in LSD 15-10-48-23W4M at the proposed well site. The inlet gas would contain a maximum H₂S concentration of 4.00 mol/kmol (0.4 per cent). The well site facility would consist of a separator, methanol tank, and water storage tank. The purpose of the facility would be to separate and measure production from the proposed well.

The proposed project would be located about 13 kilometres (km) northeast of the Town of Millet. A map is attached as Figure 1.

2.2 Intervention

Henrietta Welgan, a landowner and resident in the community of Clover Lawn, whose property is about 990 m north of the proposed 15-10 well, was opposed to the applications. Mrs. Welgan raised several concerns, including health, safety, emergency response planning, and public consultation.

2.3 Hearing

The Board held a public hearing in Wetaskiwin, Alberta, on November 1, 2007, before Board Members J. D. Dilay, P.Eng. (Presiding Member) and T. M. McGee and Acting Board Member W. A. Warren, P.Eng.

The Board panel and staff conducted a tour of the general area on November 1, 2007, prior to the hearing commencement.

Those who appeared at the hearing are listed in [Appendix 1](#).

3 BACKGROUND

Artemis submitted a number of well licence applications for the 15-10 well prior to the final application that became the subject of the November 1, 2007, hearing.

- 1) Artemis first submitted Application No. 1443596 on January 30, 2006, for a licence to drill a well at LSD 15-10-48-23W4M. The purpose of the well was to obtain natural gas from the Ellerslie Member, with a terminating depth of 1422 m. The proposed well was expected to encounter 1.3 per cent H₂S, with a corresponding EPZ of 580 km. The EPZ encompassed portions of the community of Clover Lawn, and in accordance with EUB requirements, Artemis included the entire community in the EPZ. Several residents of the community objected to the well. Therefore, Artemis withdrew its application to eliminate the prospect of drilling into a deeper sour formation.
- 2) On March 2, 2006, Artemis submitted Application No. 1450010. Artemis proposed to terminate the well in the shallower Lower Mannville Formation at 1391 m. The expected H₂S concentration applied for was 0.03 per cent, resulting in an EPZ of 50 m. The new EPZ did not encompass the community of Clover Lawn. Artemis renotified all affected parties and identified concerns from Mrs. Welgan. The EUB closed Application No. 1450010 due to an error in the information regarding the terminating formation.
- 3) Artemis replaced Application No. 1450010 with Application No. 1450472 on March 6, 2006. Following its submission, the EUB conducted a full technical review of the application. The EUB identified a discrepancy between the reported H₂S concentration and release rate data used to calculate the EPZ and decided to close the application.
- 4) Artemis replaced Application No. 1450472 with Application No. 1463933 on June 4, 2007. The new application was based on a depth of 1391 m, an H₂S concentration of 0.03 per cent, and an EPZ of 80 m. On July 12, 2006, Artemis met with EUB staff to discuss the application, expected H₂S concentration, and resulting EPZ. As a result of the meeting, the EUB conducted a full geological and technical review of the application. The EUB determined the H₂S concentration to be 0.12 per cent and the EPZ to be 120 m.

- 5) Artemis subsequently withdrew Application No. 1463933 and on September 13, 2006, submitted Application No. 1478721, which was considered by the Board at the subject hearing.

A Notice of Hearing for Application No. 1478721 by the Board on November 9, 2006. Subsequently, the Board issued a Notice of Adjournment of Hearing on December 15, 2006, as it had requested that Artemis bring forward related pipeline and facility applications. On January 4, 2007, Artemis submitted Applications No. 1494900 and 1494911. The Board issued a Notice of Rescheduling of Hearing on July 11, 2007, to consider all three applications.

On September 21, 2007, the Board issued a Notice of Rescheduling of Hearing due to the late filing by Artemis of information necessary to conduct the hearing.

4 ISSUES

The Board considers the issues respecting the applications to be

- need for and location of the well, pipeline, and facility,
- health impacts related to flaring,
- safety,
- potential for water well contamination, and
- public consultation.

In reaching the determinations contained within this decision, the Board has considered the record of this proceeding, including the evidence and argument provided by each party. Accordingly, references in this decision to specific parts of the record are intended to assist the reader in understanding the Board's reasoning relating to a particular matter and should not be taken as an indication that the Board did not consider all relevant portions of the record with respect to that matter.

5 CONSIDERATION OF THE APPLICATIONS

5.1 Views of Artemis

Artemis stated that it had acquired the petroleum and natural gas rights for twelve sections of land in the Kneller/Furness area by way of a farm-in agreement. Although six sections of land were dropped from the agreement, Artemis explained that six sections still remained for exploration. Artemis stated that it was targeting the Ellerslie A Formation for natural gas and had used two-dimensional seismic data to find an anomaly directly on top of one of its shot points in LSD 15-10-48-3W4M.

Artemis believed that the proposed 15-10 well had a 50 per cent chance of success. Artemis stated that it was not certain of the size of the reservoir, but said that it would consider half a billion cubic feet of gas to be a success.

Regarding the location of the proposed 15-10 well, Artemis stated that it considered seismic and geological information together. Artemis explained that since a seismic anomaly was detected in

LSD 15-10-48-3W4M and the Lower Mannville system was a complicated structure of intercutting and stacked channels, it believed that drilling a vertical well at the applied-for location was ideal. Artemis believed that moving the well to a location that still allowed Artemis to reach its target would not resolve Mrs. Welgan's concerns.

Artemis argued that it had established a need for the well and that if the well were successful, it would also need the applied-for pipeline and facility. Artemis predicted that drilling would commence about 30 to 60 days after issuance of the well licence. It explained that the well could be drilled in any season but it would try to avoid spring breakup, seeding, and harvest.

Artemis said that future development for the area was uncertain. It believed that if the well were not successful, it would not pursue any other development in the area. It added that if the well were successful, it might consider additional development, but it emphasized that future development was contingent on the applied-for well.

Artemis explained that it was aware of Mrs. Welgan's health concerns and for that reason had committed to using an incinerator for well testing in the event that it was not able to in-line test. Artemis testified that it preferred in-line testing to avoid emissions and to sell the gas instead of burning it. Artemis explained that it would in-line test if the information gathered from logging identified commercial quantities of gas. If this were not possible, Artemis predicted that four to six hours of well testing with an incinerator would be necessary. Artemis asserted that it would not exceed the flare volume maximums established in *Directive 060: Upstream Petroleum Industry Flaring, Incinerating, and Venting*.

Artemis stated that the proposed single-well battery was designed to prevent fugitive emissions. Specifically, it explained that the water tank and water hauling trucks would be equipped with H₂S scrubbers. However, if an odour complaint were made, Artemis confirmed that it would respond by having its field operator inspect the site to determine the nature and source of the odour.

Artemis emphasized that its ultimate goal was to protect the public, the personnel working on site, and the environment. It submitted that its drilling contractor had drilled a number of sour gas wells and believed that it was capable of drilling the 15-10 well safely.

Artemis explained that its drilling plan had originally included the deeper Ellerslie G sand, which had resulted in a higher potential H₂S release rate and a larger EPZ, which encompassed the community of Clover Lawn. Artemis subsequently revised its plan to exclude the Ellerslie G sand. This resulted in a reduced H₂S release rate and the smaller EPZ of 50 m, which Artemis indicated would not extend beyond the lease site. Artemis argued that the applied-for EPZ of 50 m was safer and eliminated the need for a site-specific emergency response plan (ERP), as no residence would be located within the EPZ.

Due to the proximity of the Ellerslie A to the Ellerslie G sand, Artemis committed to a number of measures, such as surveying the Kelly bushing after spudding, double tallying the pipe, and having a well site geologist and gas detector on site ([Appendix 2](#)). Artemis stated that it was confident that these measures would ensure that it would not exceed its licensed depth, thus avoiding accidental penetration of the Ellerslie G sand.

Artemis explained that although a site-specific ERP was not required, it had a corporate ERP in place. Artemis confirmed that it tested the plan on an annual basis, in accordance with *Directive*

071: Emergency Preparedness and Response Requirements for the Petroleum Industry.

Specifically regarding the 15-10 well, Artemis explained that before the well was drilled, it would have an ERP review meeting with its corporate personnel, followed by a review on site prior to drilling into the first sour zone. Artemis said that the field operator for the 15-10 well would attend these meetings.

Artemis acknowledged Mrs. Welgan's concerns regarding impassable roads during an emergency. Artemis clarified that it did not have site-specific measures in place within the corporate ERP to address this concern because a site-specific ERP was not required. However, Artemis stated that during activities such as a drillstem test, weather would be taken into consideration to ensure that its operations were safe. Artemis also indicated that a number of safety mechanisms would be in place to prevent an upset at the well site. It explained that several of the safety mechanisms would have to fail to have a catastrophic event at the well site. Artemis stated that it would implement the ERP and dispatch mobile air monitoring units at the first indication of a problem. It believed that the worst-case scenario resulting from an incident at the well site would be a nuisance odour from H₂S or sulphur dioxide (SO₂). Artemis did not anticipate that H₂S or SO₂ would ever reach harmful concentrations in the community of Clover Lawn.

Artemis stated that it had committed to water well testing for quantity and quality for area residents before and after drilling. Artemis said that Mrs. Welgan had refused the water well testing it had offered her. However, Artemis confirmed that if Mrs. Welgan's water well were damaged as a result of its operations, it would take any steps necessary to ensure that Mrs. Welgan had potable water. For example, Artemis stated that it might truck in fresh water or treat the water well directly.

Artemis stated that the hearing was the outcome of 23 months of public consultation that had occurred before and during its submission of multiple applications for the 15-10 well. Artemis explained that it spoke to all stakeholders on multiple occasions due to the many applications. It pointed out that the regulations required the company to consult with interested parties every time an application was submitted. Artemis expressed frustration and admitted that multiple visits could have been avoided if it had made a submission for a preapproval of the H₂S release rate.

Artemis stated that it had had extensive dialogue with Mrs. Welgan in an effort to resolve her concerns. Artemis also stated that it had engaged Mrs. Welgan in appropriate dispute resolution and had suggested a number of mitigation measures; however, no resolution was reached.

Overall, Artemis argued that there was a need for the 15-10 well and that the project was in the public interest, as natural gas royalties would flow to the Crown in right of the Province of Alberta. Artemis concluded that the licences should be granted, as it had met or exceeded all regulatory requirements.

5.2 Views of Mrs. Welgan

Mrs. Welgan acknowledged that Artemis had purchased the mineral rights for the proposed well and had the right to access those minerals. However, she believed that Artemis had not proven a need for the well at this time. Mrs. Welgan argued that while she was uncertain as to how much gas was currently on the market, she believed that the amount of gas in storage was enough to meet current demand.

Mrs. Welgan pointed out that her residence was located about 990 m from the proposed 15-10 well and that the edge of her property was only 650 m from the proposed well. She requested that Artemis move the well location; however, she had not proposed alternative locations.

Mrs. Welgan explained that her family had moved to the southeast corner of Leduc County for the clean air. She stated concerns about her health in the event of an accidental release of sour gas. While she acknowledged that Artemis would have safety measures in place, Mrs. Welgan argued that in the event of an accidental sour gas release, the community of Clover Lawn could be subject to an accumulation of H₂S, which would upset her asthma. She submitted that the prevailing winds were predominantly from the south, which placed her community downwind of the proposed project. In her submission, Mrs. Welgan quoted articles that indicated H₂S was heavier than air and could collect in low-lying areas. However, at the hearing, Mrs. Welgan acknowledged that sour gas could be lighter than air. Mrs. Welgan also cited information on the effects of H₂S on cattle but acknowledged that she was not involved in the industry and did not own cattle. Overall, Mrs. Welgan felt that Artemis had neglected her health concerns.

Mrs. Welgan said that she did not oppose the drilling of sour gas wells near Alberta communities. Rather, she was concerned with Artemis's ability to drill the 15-10 well safely and responsibly. She explained that the community roads were impassable two to three times a month in the winter. If the 15-10 well were approved, she requested that it be drilled in the summer months to avoid poor winter road conditions in the event of an emergency.

Mrs. Welgan pointed to Artemis's inability to submit a proper application and expressed concerns with its ability to drill to the currently applied-for depth without entering into the more sour Ellerslie G pool. She said that multiple applications did not instill confidence; however, after Artemis was cross-examined about the measures in place to ensure depth control, she submitted that Artemis would likely not exceed the applied-for depth.

Mrs. Welgan acknowledged that she had declined water well testing. She stated that in past discussions, Artemis had not been able to provide a resolution in the event that her water well was damaged as a result of drilling the 15-10 well. She noted that the hearing was the first time she had been given assurances that she would receive potable water if her water well were damaged. Mrs. Welgan subsequently stated she was satisfied with Artemis's proposed measures; however, she did not indicate clearly whether she wanted Artemis to test her water well.

Mrs. Welgan noted a number of concerns about Artemis's public consultation program. She expressed frustration with the number of times the public needed to be consulted due to multiple applications. Mrs. Welgan stated that she kept records of all her dealings with Artemis and that some of the conversation described by Artemis had never occurred. She believed that Artemis thought her concerns were frivolous and that Artemis never really took the time to properly address them. Reflecting upon Artemis's consultation, Mrs. Welgan wished that Artemis had been more direct, open, and honest with its information. In summary, Mrs. Welgan stated that although she was the sole intervener to the proceeding, silence on the part of other members of the community did not necessarily mean they consented to the project.

5.3 Views of the Board

The Board acknowledges that Artemis has acquired the petroleum and natural gas rights to the drill the proposed 15-10 well and that Mrs. Welgan did not provide evidence to dispute the need for the well. The Board accepts that there is a need for the well to allow Artemis an opportunity

to exploit the mineral rights it holds. In addition, the Board believes that if the well were successful, the pipeline and facility would also be needed to produce the resource.

In most circumstances, the Board expects companies to consider alternative locations for proposed projects in an effort to alleviate intervener concerns. In this case, the Board recognizes that Mrs. Welgan did not provide specific location alternatives for Artemis to consider, nor did she identify any environmental factors specific to the proposed location. The Board also recognizes that deviated wells, depending on a number of geological and technical factors, can create challenges for an applicant to reach its intended target. Therefore, the Board is satisfied with the location proposed by Artemis and agrees that unless the well were moved a considerable distance from Mrs. Welgan, a location change would not resolve her concerns.

The Board notes that Artemis must meet the requirements of *Directive 060* and the Alberta Ambient Air Quality Objectives for SO₂ and H₂S emissions. The Board acknowledges Artemis's commitment to incinerate sour gas during well testing in the event it is not able to in-line test. The Board also notes that Artemis will install H₂S scrubbers on its water tank and trucks in an effort to eliminate odours from the 15-10 well lease site. The Board is aware of Mrs. Welgan's health concerns and believes that the measures Artemis will have in place will appropriately mitigate those concerns. The Board agrees with Artemis that if an accidental release of sour gas were to occur at the H₂S concentrations applied for, the worst-case scenario would be a nuisance odour at Mrs. Welgan's residence.

The Board is aware that Mrs. Welgan cited a number of sources of information, including letters, articles, and reports, to support her position, particularly on the health effects of H₂S exposure. The Board recognizes the amount of time and effort put into her submission; however, neither the Board nor the applicant was in a position to test the information, as no authors or other experts were provided. Although interveners are not required to have expert witnesses, in the case of complex issues, such as potential health impacts of sour gas emissions, the Board believes expert witnesses are required to support the intervener's evidence.

Regarding safety, the Board notes that a site-specific ERP is not required for the proposed 15-10 well, as the EPZ does not encompass any surface developments. In the course of its review of the series of Artemis's well licence applications, the EUB completed a review of Artemis's corporate ERP and found that it meets the requirements set out in *Directive 071*. The Board acknowledges Mrs. Welgan's concerns regarding road conditions. The Board is confident that these concerns will be mitigated by Artemis's corporate ERP in the event of an emergency.

The Board recognizes that if the Ellerslie G pool were penetrated, it might trigger the need for a site-specific ERP. The Board is fully satisfied with the measures committed to by Artemis to ensure that the applied-for depth is not exceeded. However, if Artemis drilled to a deeper depth with a higher H₂S release rate, it would be required to suspend drilling, notify the public, and make application to the Board for a licence amendment, and if the ERP were expanded to include a residence, make application for approval of a site-specific ERP.

The Board understands that Mrs. Welgan is concerned about water well contamination but did not accept Artemis's offer to test her well. In the proceeding, it was not clear that Mrs. Welgan would now accept Artemis's offer to test her water well prior to and after drilling the 15-10 well. The Board notes that Artemis undertook to make reasonable efforts to address any water well contamination as a result of its project; however, without baseline data to establish cause and effect, the Board believes that it would be difficult, if not impossible, to determine whether

change had occurred. Therefore, the Board encourages Mrs. Welgan to consider accepting Artemis's offer to test her water well.

The Board confirms that Artemis met the public consultation requirements in *Directive 056: Energy Development Applications and Schedules*. However, it appears to the Board that Artemis's consultation style may have been a root cause of many concerns expressed by Mrs. Welgan. The Board heard conflicting accounts of what was said or committed to in one-on-one discussions between the applicant and intervener and detects a lack of trust between the two parties. The Board attributes some of this lack of trust to the succession of applications submitted by Artemis and repeated communications with the public. Artemis acknowledged that it should have considered making a preapplication submission to the EUB to obtain a predetermined H₂S release rate. The Board agrees that this would have provided Artemis with the proper foundation to determine its consultation and application requirements, which may have eased Mrs. Welgan's mistrust and resolved some of the other issues heard by the Board.

In conclusion, the Board believes that Artemis has met the applicable EUB requirements for the proposed project and agrees that the commitments made by Artemis are sufficient to reasonably address Mrs. Welgan's concerns. These commitments are listed in [Appendix 2](#).

Dated in Calgary, Alberta, on January 15, 2008.

ALBERTA ENERGY AND UTILITIES BOARD

<original signed by>

J. D. Dilay, P.Eng.
Presiding Member

<original signed by>

T. M. McGee
Board Member

<original signed by>

W. A. Warren, P.Eng.
Acting Board Member

APPENDIX 1 HEARING PARTICIPANTS

**Principals and Representatives
(Abbreviations used in report)****Witnesses**

Artemis Exploration Inc.
D. C. Edie, Q.C.

M. R. Waite, P.Eng.
S. E. M. Targett
F. J. Foster,
of Mega Engineering Ltd.
D. A. Quirk, P.Eng.,
of Accutech Engineering Inc.
G. K. McCredie,
of Vision HSE Management Services
Limited

H. Welgan

H. Welgan

Alberta Energy and Utilities Board staff
J. P. Mousseau, Board Counsel
J. Smith
J. FitzGerald

APPENDIX 2 SUMMARY OF COMMITMENTS

The Board notes throughout the decision report that Artemis has undertaken to conduct certain activities in connection with its operations that are not strictly required by EUB regulations or guidelines. These undertakings are described as commitments and are summarized below. It is the Board's view that when a company makes commitments of this nature, it has satisfied itself that these activities will benefit both the project and the public, and the Board takes these commitments into account when arriving at its decision. The Board expects the applicant, having made the commitments, to fully carry out the undertaking or advise the EUB if, for whatever reasons, it cannot fulfill a commitment. The EUB would then assess whether the circumstances regarding the failed commitment warrant a review of the original approval. The Board also notes that the affected parties also have the right to request a review of the original approval if commitments made by the applicant remain unfulfilled.

COMMITMENTS BY ARTEMIS

- Artemis commits to using an incinerator during well testing if in-line testing is not feasible.
- Artemis commits to surveying the actual kelly bushing elevation following rig-up. The data will be used to recalculate the depths on the geological prognosis for the drilling of the 15-10 well.
- Artemis commits to having a well site geologist present on site and increasing the geological sampling interval from every 5 m to every 2 m from -560 m subsea (SS) to total depth.
- Artemis commits to using a gas detector on site.
- Artemis commits to checking geograph and pipe tallies before the drilling depth reaches -560 mSS, and if significant discrepancies are apparent, Artemis will trip out the drill string and retally back into the hole.
- Artemis commits to control drilling practices below -560 m SS, with reduced penetration rates from -560 m SS to total depth, to allow enhanced sampling intervals, improved gas detection accuracy, and an accurate determination of when the shale separating the bottom of the Lower Mannville sandstone channel from the Ellerslie G (if present) has been entered.

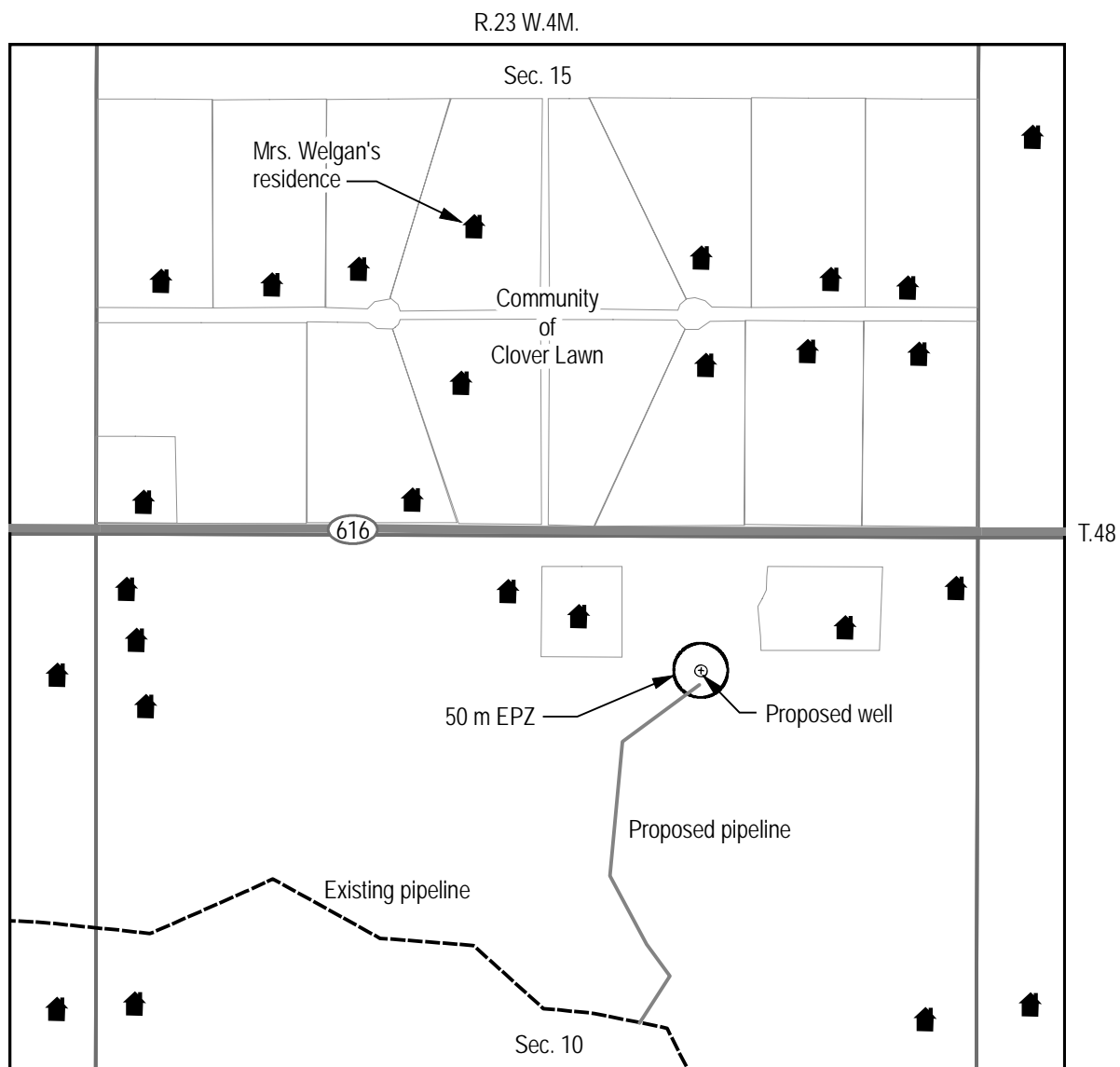


Figure 1. Area map