

SITE-SPECIFIC INVESTIGATION REPORT
TURNER TRACT BLOCK 2 LOT 11
LARAMIE, WYOMING

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Project #: 415-022-001

SUBMITTED BY: Trihydro Corporation

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Table of Contents

1.0	INTRODUCTION.....	1-1
2.0	SITE-SPECIFIC INVESTIGATION DATA.....	2-1
3.0	SITE-SPECIFIC INVESTIGATION CONCLUSIONS.....	3-1
4.0	REFERENCES.....	4-1



List of Figures

1. Site Location and Geology Map, Turner Tract Block 2 Lot 11, City of Laramie, Site-Specific Investigation, Laramie, Wyoming
2. Site Features, Turner Tract Block 2 Lot 11, City of Laramie, Site-Specific Investigation, Laramie, Wyoming



List of Appendices

- A. FIELD INSPECTION PHOTOGRAPHS
- B. LARAMIE FLOOD MAP



1.0 INTRODUCTION

The City of Laramie (City) owns the property located at Turner Tract Block 2 Lot 11. The property is located at the northeast corner of Crystal Court and Beech Street in Laramie, Wyoming, in the southwest quarter of the northeast quarter of Section 2, Township 15 North, Range 73 West. The property lies within the boundaries of the Casper Aquifer Protection Overlay Zone (APO Zone) described in the *Casper Aquifer Protection Plan (CAPP)*, which was approved by the City of Laramie on June 3, 2008. This site-specific investigation (SSI) report addresses possible development in accordance with the requirements of Section 15.08.040.A of the Laramie Unified Development Code (UDC).

The City has no current plans to develop the property though the possibility for future development exists. Future development of the property may include commercial facilities. For the purpose of this SSI, Trihydro assumes future development of the property similar to other lots in the Turner Tract. Lots within the Turner Tract are planned for development as commercial and office use. For this reason, Trihydro has evaluated the risk of contamination such a development may pose to the Casper Aquifer.

This investigation report was prepared by a professional geologist (required by Section 15.08.040.A.8.a) on behalf of the City. The report identifies potential groundwater impacts from the proposed development (required by Section 15.08.040.A.8.b) and describes existing conditions, proposed activities, and applicable stormwater management techniques (required by Section 15.08.040.A.8.c).



2.0 SITE-SPECIFIC INVESTIGATION DATA

Information required in the site-specific investigation is presented in the Laramie UDC, Section 15.08.040.A. The results from the site-specific investigation are presented below by the code citation, followed by the applicable investigation data or response.

1. A literature search to determine the presence of mapped faults, folds, fractures, and other evidence of conduit flow on the subject property: In conducting the literature search for this site-specific investigation, references reviewed/consulted include the following:

- Geologic maps of the area (Ver Ploeg 2009)
- City of Laramie GIS maps

During the literature search, the Sherman Hills fault and an unnamed drainage were identified to be in the vicinity of the property. The fault is an east-west trending high-angle reverse fault, with the southern side being the downthrown side of the fault. The location of the fault, as mapped by Ver Ploeg (2009) in relation to the subject property, is shown on Figure 1. The fault is located more than 100 feet from the subject property.

The historical location of the unnamed drainage is shown on Figure 1. The unnamed drainage has been relocated to cross under Beech Street further east than the historical location, as shown on Figure 2. The drainage flows through a culvert under Beech Street and then heads west to a detention pond southwest of the property. The drainage is located on the eastern portion of the subject property.

2. A Site narrative that includes historical information on previous land use, contaminant releases, abandoned wells, underground storage tanks, and septic systems as well as any other information relevant to the site: The subject property is currently owned by the City and zoned as LM – Limited Manufacturing. The property is currently undeveloped. A fire hydrant and electrical junction box are located in the southwestern corner of the subject property. Additionally, another electrical junction box is located in the southeastern corner of the property. The locations of the underground power lines associated with these boxes are unknown. City sewer and water lines are located in the center of Crystal Court and Beech Street. Photographs of the subject property are presented in Appendix A.

Based on a review of the Wyoming Department of Environmental Quality, Solid and Hazardous Waste Online database, a record of previous contaminant releases at the subject property was not identified.

3. A site plan showing the proposed use and zoning of the property including existing and proposed ground contours accurate to a two-foot interval as referenced to the USGS contour map for the area or other specified elevation standard as required by the City, and for a distance of at least five hundred feet beyond any proposed development



activity, existing and proposed structures, parking areas, driveways, landscaping areas, setbacks, surface and subsurface drainage facilities, potential contaminant storage locations and methods of storage, above ground storage tanks, best management practices, utilities, roads, storm water management, and a vicinity map. Where necessary, specific construction details shall be provided to assure adequacy to accept design standards: A preliminary site plan for development is not presented as there are no plans to develop this property at this time. Based on the zoning (LM – Limited Manufacturing) and size and location, the most likely development for this property is as commercial or office use.

4. Identification of potential contaminants and amounts stored, generated, or handled on the subject property: The size and location of the property allows for the development of numerous types of businesses and other facilities. Such facilities generally generate, handle, and store limited types and quantities of potential contaminants on site. These types of materials may include household cleaning supplies in small quantities for use in the building, and possibly landscaping maintenance supplies (fertilizer, pesticide, and insecticide) in small quantities. Petroleum products in quantities exceeding 5 gallons are unlikely to be stored in such facilities.
5. A field inspection shall be conducted to verify the presence or absence of vulnerable features as defined in Section 15.08.040.A. A summary of the field inspection shall include a written report, maps identifying vulnerable features, and the distance and direction of the nearest well and vulnerable feature. Where subsurface wastewater disposal is proposed, the investigator shall conduct deep pit soil analysis to a depth at least five feet below the proposed bottom of the leaching system to establish that there are no obstructions such as bedrock, water table or other forms of refusal that could interfere with the proper functioning of the wastewater disposal system: A field inspection of the subject property was conducted on May 14, 2015, for the purpose of identifying site features, identifying current land use, and gathering information to be included in this site-specific investigation report. Photographs of the property are presented in Appendix A. The aforementioned drainage was observed near the eastern boundary of the property.

The nearest wells to the subject property are the M&W Investments-1 well (M&W well) and the LCCC – WW No. 1 and No. 2 wells (Wyoming State Engineer’s Office (WSEO) Permit Number U.W. P178312W, P170575W, and P170576W, respectively). The M&W well is located southeast of the subject property in the southeast quarter of the northeast quarter of Section 2, Township 15 North, Range 73 West. The exact location of this well could not be confirmed based on information in the WSEO database and field observations, but information in the WSEO database suggests that the well is likely near the apartments located at the corner of Beech Street and Glacier Street. The LCCC wells are located northwest of the subject property on Laramie County Community College tract in the northwest quarter of the northeast quarter of Section 2, Township 15 North, Range 73 West. The locations of these wells are shown on Figure 1.

Development at the property will be served by City sewer and water facilities, so subsurface wastewater disposal is not expected for proposed future developments. Therefore, deep pit soil analysis was not conducted for this site-specific investigation.

6. A map showing the area and types of exposed bedrock, marshes, perennial drainages, intermittent drainages, ephemeral drainages, creeks, and other bodies of water on the subject property: Figure 1 shows the location of exposed bedrock surrounding the property. The northeastern portion of the property is covered by Quaternary Terrace deposits. The remainder of the property is covered by Quaternary alluvium and colluvium deposits.

The thickness of the Satanka Shale was estimated based on the dip and distance of the nearest Casper Formation outcrop east of the property. Using a dip of 3 degrees and a distance of 4,250 feet and accounting for the elevation change between the property and the outcrop (approximately 104 feet), the estimated minimum thickness of Satanka Shale is 118 feet. This thickness compares to the thickness of Satanka Shale (124 feet) in the LCCC - WW1 (SEO Permit Number P170575W), located approximately 800 feet west of the subject property. The lithology log from the abandoned monitoring well SHFCA-2, located approximately 250 feet south of the subject property, indicates that the thickness of the Satanka Shale is approximately 230 feet. Both values are greater than the thickness of 75 feet determined to be sufficient to protect the Casper Aquifer from contamination from infiltration of surface contaminants.

The nearest intermittent drainage is located on the eastern portion of the property. This drainage has been relocated from its original location and now crosses Beech Street further east than its original route. The relocated drainage spills into the detention pond located southwest of the subject property.

7. Where the 100-year flood plain mapping is unavailable, the professional geologist and/or engineer will calculate the 100-year floodplain for the drainage. The flood plain mapping will be provided on a site map with a scale not to exceed 1 inch equals 200 feet: Based on data from the Federal Emergency Management Agency (FEMA) Flood Plain mapping, effective October 16, 1996, the subject property is located outside of the 100-year flood plain. The FEMA mapping indicates that the property is located outside the 500-year flood plain as well. The portion of the 1996 flood plain map showing the property is included as Appendix B.
8. An evaluation of the water supply and sewage system that includes the potential effects or risks of the system to the Casper Aquifer and its recharge area and the adequacy and safety of the systems. Items such as floor drains and plumbing schematics and the locations of potential contaminants, waste storage, and liquid transfer area locations shall be provided: Facilities and buildings on the property will be served by City of Laramie sanitary sewer and water utilities, and, therefore, will not necessitate individual septic systems or water supply wells. Water and sewer services will likely be connected to facilities located in Boulder Drive. These connections will be designed in such a way as to limit the possibility of an undetected leak, such as double walled piping and pressure testing.

Other facilities such as plumbing, waste storage, and liquid transfer areas will be evaluated based on the type of development proposed for the property.

9. A map(s) depicting the potentiometric surface of the Casper Aquifer at the subject property using data from historical water level measurements and published potentiometric surface maps. No new wells shall be drilled for the purpose of determining the potentiometric surface: The potentiometric surface contours of the Casper Aquifer are shown on Figure 1. The potentiometric surface was generated based upon the water-level data gathered from the Laramie Water Management Study, Level II (Toboga 2006). The potentiometric surface indicates that groundwater at the property flows generally from east to west.
10. A surface water risk assessment and mitigation plan for any impacts caused by storm water runoff, retention and/or detention basins on the City water supply and the Casper Aquifer: Based on the thickness of Satanka Shale covering the property and the lack of faults underlying the property, the potential for contaminant infiltration is low. Assuming a commercial or office space development, the risk of contaminant infiltration from stormwater would likely be due to oil and grease accumulation on the parking lot. The stormwater drainages located on the eastern portion of the property could be used to convey stormwater runoff away from the property. The parking lot should be curbed around its perimeter to allow for control of stormwater that is potentially contaminated with oils accumulated from the parking lot. This measure would also facilitate collection of hazardous substances (fuel, oil, and other automobile fluids) that may be released during a spill or accident in the parking lot.
11. A maintenance plan and agreement for any retention and/or detention basins and associated improvements will be required. Such plan and agreements shall be recorded in the Albany County Clerk's Office: Depending on the type and size of the development, a detention basin may or may not be required for stormwater management. The need for and maintenance of such facilities should be addressed during the development planning process. The existing City-owned detention pond located southwest of the subject property may be used for stormwater management, depending on the type and size of the development.
12. A groundwater risk assessment and mitigation plan to respond to any evidence of contamination or vulnerability which is the result of the development. Such plan shall not limit the liability of any person for impacts to the Casper Aquifer: As mentioned previously, the thickness of Satanka Shale covering the property and the lack of faults underlying the property reduce the risk of contaminant infiltration to the Casper Aquifer at the subject property. Development on the property will use City municipal sanitary sewer and water facilities. Groundwater risks from these facilities are therefore low based on the information presented above, and a mitigation plan is not proposed for the subject property. Depending on the type and size of the development, a groundwater risk assessment should be further considered during the planning process.

13. Demonstration of compliance with all applicable City Standards: During the design of the property, professional design services will be provided by architects and engineers registered in Wyoming. The design and construction plans will follow City of Laramie standard details. Plans and designs are subject to the City review process prior to approval.



3.0 SITE-SPECIFIC INVESTIGATION CONCLUSIONS

Development of the Turner Tract Block 2 Lot 11 property located at the northeast corner of the Crystal Court and Beech Street is not proposed at this time. However, future development could include commercial or office space. Vulnerable features identified within 100 feet of the property include the intermittent drainage located on the eastern portion of the property. The thickness of Satanka Shale overlying the Casper Aquifer (approximately 118 feet) is sufficient to minimize infiltration of contaminants to the Casper Aquifer. The parking lot associated with future development should be curbed around its perimeter to facilitate collection of oil and grease that may accumulate in stormwater from the parking lot prior to discharging off the property. Buildings and facilities on the property will be served by existing City sanitary sewer and water services. These connections will be designed to meet City standards to limit undetected leaks to the subsurface. Based on these findings, the risk of contamination to the Casper Aquifer from commercial or office space development on this property is low.

4.0 REFERENCES

CAPP 2008, Casper Aquifer Protection Plan. City of Laramie, Wyoming.

City of Laramie/Albany County. Environmental Advisory Committee. 2006. Laramie Regional Drinking Water Protection Plan. An Aquifer Protection Plan for the City of Laramie, WY.

Federal Emergency Management Agency. 1996. Flood Insurance Rate Map – City of Laramie, Wyoming. Wyoming: Community Panel Number 560002 0005 D.

Toboga, Karl G. 2006. Laramie Water Management Study, Level II. Wyoming: Wyoming Water Development Commission Report.

Ver Ploeg, Alan J. 2009a. Geologic map of the Laramie quadrangle, Albany County, Wyoming: Wyoming State Geological Survey Map Series 50 (MS-50). Map scale 1:24,000. 1 sheet.

Weston Engineering. 2012. Wyoming State Bank addition site specific geologic and hydrogeologic investigation report: Laramie, WY.

FIGURES

APPENDIX A

FIELD INSPECTION PHOTOGRAPHS

APPENDIX B

LARAMIE FLOOD MAP