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City of Laramie
City Manager's Office
P.O. Box C
Laramie, Wyoming 82073

Attn.: Mr. Darren Parkin
Water Resources Manager

Re: Site Specific Investigation
East Grand Avenue Property
Technical Review

Dear Mr. Parkin:

This letter serves to present the findings of our technical review of the site specific investigation prepared by Trihydro Corporation (Trihydro) for the City of Laramie for the City owned East Grand Avenue Property parcel of land located within the Casper Aquifer Protection Area. Our review comments will be presented to address the adequacy of this site specific investigation in fulfilling the requirements of the City of Laramie's Unified Development Code, subsection 15.08.040.A.8.

15.08.040.A.8(d)(i) A literature search to determine the presence of mapped faults, folds, fractures, and other evidence of conduit flow on the subject property.

Trihydro's literature search to address the presence of mapped faults, folds, fractures, and other evidence of conduit flow on the site of the subject property is adequate although somewhat limited. Trihydro identified two mapped vulnerable features; the Quarry fault and an unnamed ephemeral drainage which transects the acreage in an east-west direction. Both of these features are within the required vulnerable feature setback distance of 100 feet (City of Laramie Unified Development Code, subsection 15.08.040.A.7(b)).

As mentioned, the literature search performed by Trihydro appears to be adequate to identify the mapped features in the project location; however, it is recommended that previous SSI reports in the study area be reviewed both for thoroughness and consistency. A review of previous SSI reports will benefit the City of Laramie in developing their overall understanding of the hydrogeologic conditions within the Casper Aquifer Protection Overlay Zone. If inconsistencies are found with other data reported in previous SSI reports, these inconsistencies should be identified with a justification for the discrepancy. Previous SSI reports that have been submitted to the City of Laramie that are within the general area of this SSI report include the following:

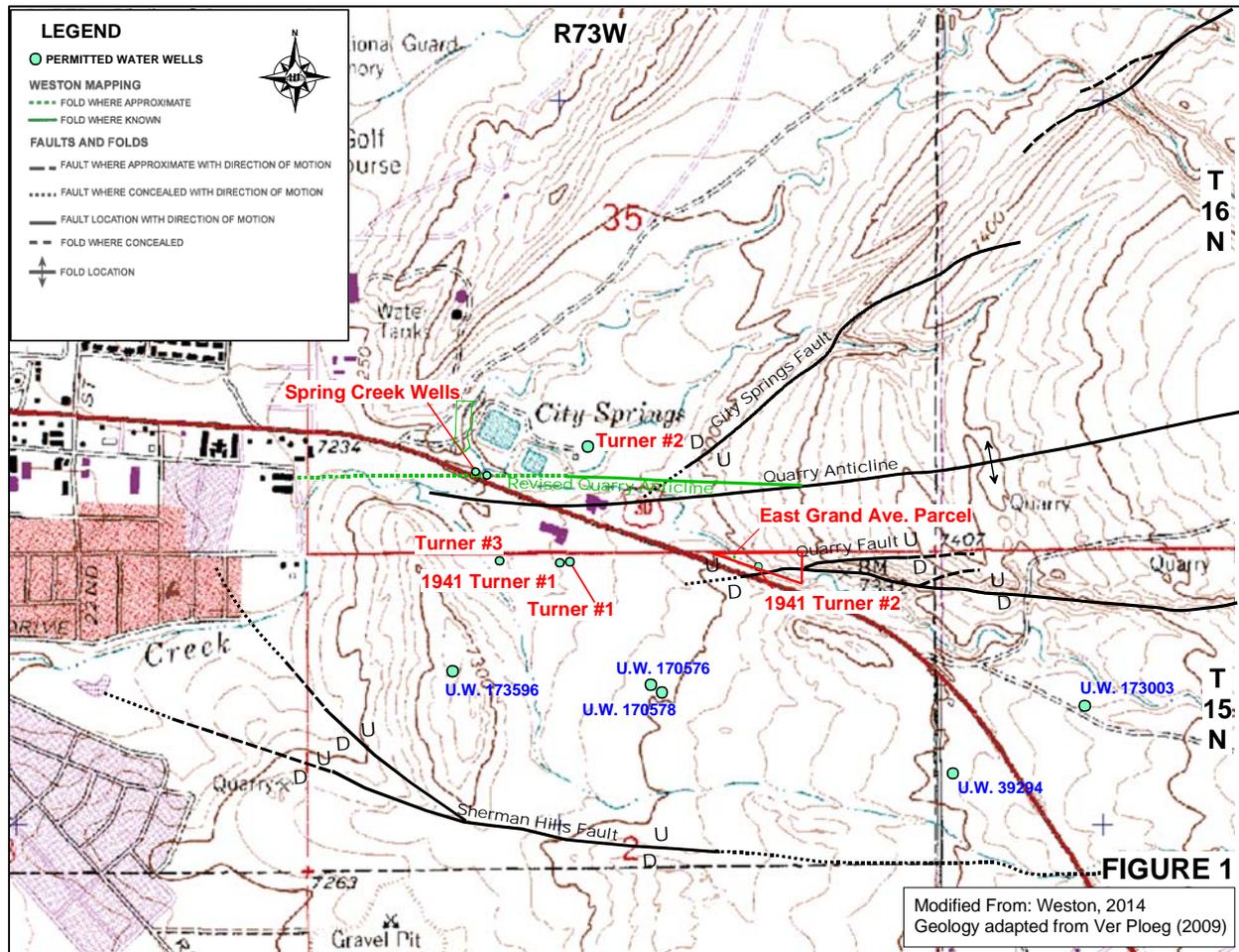
- Final Site-Specific Investigation Report, Laramie Ford Expansion, Revision No. 3, Prepared by Trihydro Corporation for Grothouse Construction, November 12, 2012.
- Technical Review of: SSI Report Laramie Ford Expansion, Grothouse Construction, Laramie, Wyoming. Revised June 7, 2011 by Trihydro Corporation. Technical review prepared and submitted by Wyoming Groundwater, LLC, June 10, 2011.

- Technical Review of: SSI Report Laramie Ford Expansion, Groathouse Construction, Laramie, Wyoming. Revised June 7, 2011 by Trihydro Corporation. Technical review prepared and submitted by Wyoming Groundwater, LLC, November 23, 2012.
- Addendum to Site-Specific Investigation for White's University Motors for Commercial Building Services Inc. Prepared by Trihydro Corporation, May 2, 2014.
- Technical Review of: Addendum to Site-Specific Investigation for White's University Motors for Commercial Building Services Inc. May 2, 2014, by Trihydro Corporation. Technical review prepared and submitted by Wyoming Groundwater, LLC, June 10, 2014.
- Site-Specific Geologic and Hydrogeologic Investigation Report Wyoming State Bank Addition. Prepared by Weston Engineering for Snowy Range Investments, LLC, March 2012.
- Technical Review of the Site-Specific Geologic and Hydrogeologic Investigation Report Wyoming State Bank Building Addition Provided by Weston Engineering to the City of Laramie. Technical review prepared and submitted by InterTech Environmental & Engineering, LLC, March 22, 2012.
- Site-Specific Investigation Report for City of Laramie, City Springs Chlorination Application Site Improvements. Prepared by WWC Engineering for the City of Laramie, June 10, 2010.
- Technical Review of: SSI Report for City Springs Chlorination Application Site Improvements. June 10, 2010, by WWC Engineering. Technical review prepared and submitted by Wyoming Groundwater, LLC, July 1, 2010.
- Site-Specific Geologic and Hydrogeologic Investigation Report, American National Bank Exterior Improvements Project. Prepared by Weston Engineering for Realty Management Group, September 15, 2014.

Some, or all of these documents may have been reviewed by Trihydro as part of their efforts in preparing the SSI report (several of these documents were generated by Trihydro), but it is unknown if they were reviewed since they were not listed in this section of the SSI report or in the reference section. If other documents were reviewed, they should be noted as such so that the City of Laramie and the SSI technical reviewer can judge the full depth of review that has taken place in the preparation of the SSI document.

One item that was researched and discussed in later sections of Trihydro's SSI, but not listed in this section of their report, were the State Engineer's Office completion records for the wells in the subject property area. A review of the statement of completion records for the wells in the area indicated that three of these wells referenced either encountering fractures or losing circulation of the drilling fluid during the drilling phase. These wells are the two Wyoming State Highway Department wells (Spring Creek Well Nos. 1 and 2) located approximately ¼ mile west of the East Grand Avenue Parcel and the Bone and Joint #1 Well (U.W. 39294) located approximately ¼ mile south of the East Grand Avenue Parcel. The driller of the Spring Creek wells documented encountering "fractured zones" at depths below approximately 20 feet. The

driller of the Bone and Joint well indicated that circulation was lost during drilling from 36 feet below ground level to the well's total depth at 140 feet. Reference to fracture zones and lost circulation in the nearby wells is evidence that conduit flow could be present in the area of the East Grand Avenue Property parcel although no fractures were recorded as being encountered in the 1941 Turner #2 Well which is located within the parcel boundaries. The locations of the Spring Creek wells and Bone and Joint well are shown in the figure below.



15.08.040.A.8(d)(ii) 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.

As described in Trihydro's SSI report, development on the property consists of the Imperial Heights Pump Station. Additionally, development on the parcel includes the 10-inch inlet and outlet water pipelines associated with the Imperial Heights Pump Station, an electric transformer and buried power lines associated with the electrical service to the Imperial Heights Pump Station. Imperial Heights Pump Station has an enclosed diesel generator with a base fuel storage tank for a backup power supply.

A review of the WDEQ Solid and Hazardous Waste Division's website and EPA's Enviromapper databases shows that there have been no recorded contaminant releases and we concur that there is no evidence of any contaminant releases on the project site.

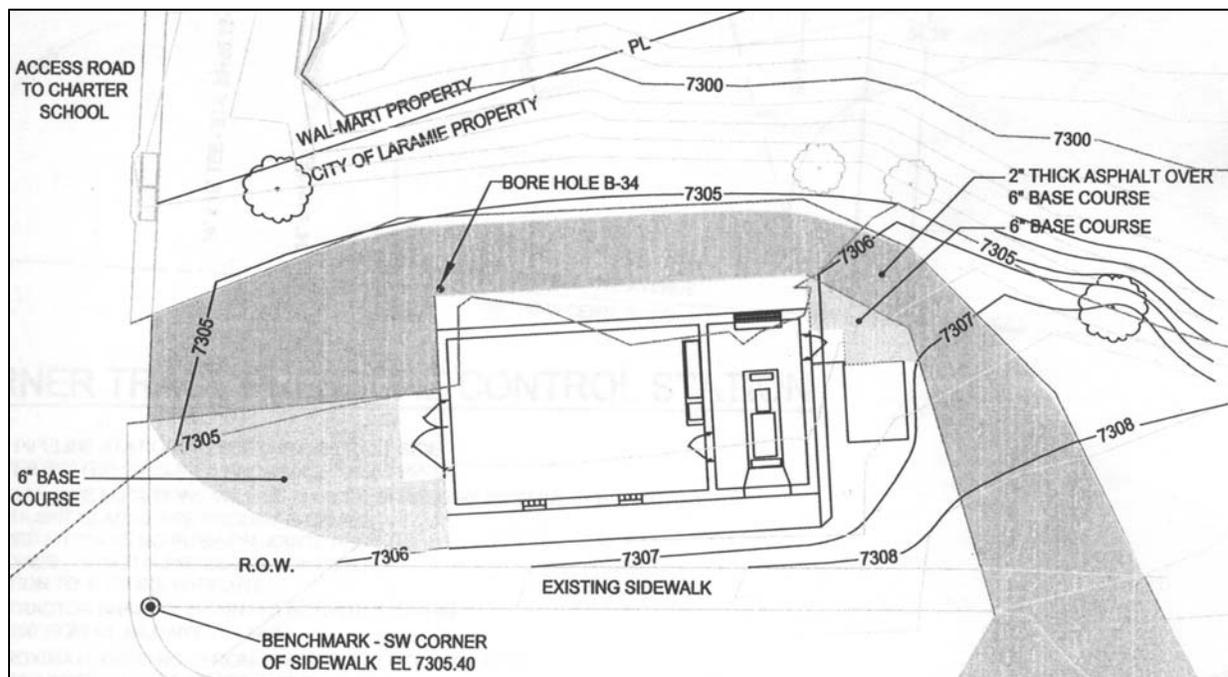
Our review of the Wyoming State Engineer's Office (SEO) E-Permit website indicates that there have been no wells permitted with the SEO in Sections 35 of Township 16 North, Range 73 West and Section 2 of Township 15 North, Range 73 West since Trihydro prepared the SSI. Therefore, based on the data presented in the SSI report and as discussed in the site investigation narrative, Trihydro has confirmed that there are no other wells on the project site other than the 1941 Turner #2 Well.

With the data presented, and from their narrative with respect to their contaminant release and well research, Trihydro has met the requirements of this section.

15.08.040.A.8(d)(iii) 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, stormwater management, and a vicinity map. Where necessary, specific construction details shall be provided to assure adequacy to accepted design standards.

The SSI prepared by Trihydro does not address this section. A preliminary site plan was not presented by Trihydro as they state "A preliminary site plan for development is not presented as the City has no plans to develop this property at this time." The SSI report did present a surface geology map that has the Laramie USGS 7.5 Minute topographic map as a background (Figure 1). However, the scale of this map did not accurately reflect the topography (scale of map was too large to show adequate number of contours and the contour labeling). The SSI report also incorporates an aerial photograph as a background (Appendix B) which shows the existing land use in the area. The figure on the preceding page of this review letter report shows the topographic conditions for the East Grand Avenue Property. The contour interval for this figure is 10 feet. The site map for the construction of the Imperial Heights Pump Station showing the finished surface elevations is shown on the following page.

In general we agree with the concept presented in the SSI report that this section cannot be fully addressed at this time due to the status of the development plans for this parcel of land. However, we feel it would be beneficial to the City to include some of the requested information such as a topographic map, a discussion of the existing land use practices in the area and some general discussion with respect to development constraints or issues associated with this parcel of land due to its proximity to the vulnerable features identified in paragraph 15.08.040.A.8(d)(i).



15.08.040.A.8(d)(iv) Identification of potential contaminants and amounts stored, generated or handled on the subject property.

As identified in the SSI, the City of Laramie presently has no plans to develop the property with the possible exception of additional landscaping and beautification efforts. As such, the future landscaping/beautification work may include the following prohibited activities as listed by Table 15.08.040.A – Prohibited Activities:

1. Application of pesticides and herbicides which do not become non-hazardous within 48 hours of application or which are not applied according to the manufacturer's instructions.
2. Application of fertilizer at greater than the agronomic uptake rate of the vegetation fertilized.

All of these prohibited activities were addressed in the Trihydro SSI. Additionally, the SSI report identified the potential use of gasoline and/or diesel on the acreage, but qualified this by stating that these fuels would not be stored on site.

The backup power supply generator for the Imperial Heights Pump Station appears to be a prohibited activity as defined by Table 15.08.040.A – Prohibited Activities (*Commercial and home occupation generation of electrical power by means of fossil fuels except generation by means of natural gas or propane.*) It should be noted, just for clarification, that the backup generator in the Imperial Heights Pump Station is a diesel fueled 200 kW generator with a double wall, welded steel fuel storage tank with a usable capacity of 390 gallons, not a gasoline fueled system with a polyethylene storage tank as stated in the SSI report.

15.08.040.A.8(d)(v) A field inspection shall be conducted to verify the presence or absence of vulnerable features as defined in subsection 15.08.040.A.7.a A summary of the field inspection shall include a written report, maps identifying the 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.

The requirements of this section were met by the Trihydro SSI. A field inspection was conducted on April 29, 2015 and the wells on the property were identified in the text and in Figure 1 of the report. This figure provides the requested distance and direction information of the wells. As discussed under the 15.08.040.A.8(d)(i) section, two vulnerable features, Quarry anticline and an unnamed ephemeral drainage, were identified in the East Grand Avenue Property area. The 100 foot setback distance from these two vulnerable features incorporates nearly this entire parcel of land. The SSI prepared by Trihydro presents a map (Figure 1) which identifies the location of only the Quarry fault. The location of the other vulnerable feature, unnamed drainage, is discussed in the text of the SSI report but is not called out in this figure. The drainage is shown more clearly in the figure in Appendix B of the SSI report, but is again not labeled. No evidence of fracturing was noted in the unnamed drainage and no spring flow is present. During the design and construction of the Imperial Heights Pump Station, no groundwater was encountered in the initial 20 feet of soil at the pump station site (Soil Boring B-34 – location shown in figure on previous page).

The Trihydro SSI report accurately identifies the nearby well as the 1941 Turner No. 2 Well. This well was originally permitted, as reported by Trihydro, as U.W. 157C. This permit was canceled and a new permit was issued in 1995 for the use of this well as a monitoring well (U.W. 99781). The State Engineer's Office lists the U.W. 99781 permit as being cancelled as well. In addition to the 1941 Turner No. 2 well, the location of the Turner #2 well (U.W. 55508 and U.W. 59131) is shown on Figure 1. The locations of other wells in the area have been shown in the figure on page 3 of this letter report.

Onsite wastewater systems are not proposed for future development of the property. Therefore, a deep pit soil analysis for this SSI was not required and was not conducted.

15.08.040.A.8(d)(vi) 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.

The report maps and report narrative meet the requirements of this section. Labeling of the drainage on the figures is recommended. The ephemeral drainage area extends to the east approximately 4½ miles.

15.08.040.A.8(d)(vii) Where the 100-year flood plain mapping is unavailable, the professional geologist and/or engineer will calculate the 100-year flood plain 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.

Wester-Wetstein reviewed Federal Emergency Management Administration (FEMA) Flood Insurance Rate Map (FIRM) Panel NO 56001C1770E for Albany County, Wyoming with an

effective date of June 16, 2011 available online at the FEMA Map Service Center website. A review of this map confirms the findings of Trihydro's SSI. It should be noted that the Federal Emergency Management Administration (FEMA) Flood Insurance Rate Map as quoted in the SSI has been updated. The effective date of Panel NO 56001C1770E is June 16, 2011 and not October 16, 1996. The update of this panel, however, does not impact the findings in Trihydro's SSI report.

15.08.040.A.8(d)(viii) An evaluation of the water supply and sewage system that includes the potential effects or risks of the systems 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.

The SSI prepared by Trihydro does not address this section as they state: "Development to this property is likely limited to landscaping and beatification work along with operating/maintaining the pump house, as such the water supply for irrigation will be served by the Ctiy municipal system. A sewage system is not needed for this type of development." If future development were to occur on this parcel that included water and wastewater services, they would be required to meet WDEQ standards and all other applicable building codes and therefore would pose a minimal risk to the Casper Aquifer.

15.08.040.A.8(d)(ix) 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.

Trihydro's SSI satisfied this requirement. The potentiometric contours for the Casper Aquifer were superimposed upon the surface geologic map and were based upon data from the Laramie Water Management Study, Level II (2006). The potentiometric contours indicate that groundwater in the Casper Aquifer beneath the East Grand Avenue property is moving in a westerly direction under a gradient of approximately 2 feet per 900 feet.

15.08.040.A.8(d)(x) 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.

Wester-Wetstein agrees with Trihydro's evaluation of the potential risk to the Casper Aquifer from storm water runoff. The quality of the stormwater that is conveyed to the drainage channel that transects the property should be monitored. A spring is present in this channel approximately ¼ mile west of the East Grand Avenue, just to the north of White University Motors (Ford Dealership). The presence of this spring and the close proximity to the Turner #2 well provide an avenue for contaminants in the channel flow to enter the Casper Aquifer System. The current use of the property, Imperial Heights Pump Station, and undeveloped acreage, represent a minimal risk to the aquifer from stormwater runoff. However, precautions should be taken when filling the fuel tank on the backup generator to prevent spillage. Any diesel fuel that is spilled during the refueling process should be cleaned up and not allowed to be discharged into the drainage channel.

15.08.040.A.8(d)(xi) 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.

As stated by Trihydro, a maintenance plan and agreement will probably not be needed since it is not anticipated that retention, detention or other stormwater management facilities will be constructed on this site other than the existing channel that transects the property. Because of the lack of Satanka Shale cover at this property location and the presence of the springs in this channel down-gradient, additional stormwater collection facilities are not recommended for this property.

15.08.040.A.8(d)(xii) 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.

Wester-Wetstein agrees with the conclusion provided by Trihydro that the risk of contamination to the Casper Aquifer from this present use of the East Grand Avenue Property parcel is low. In addition, the potential risk to the aquifer from the type of proposed development of this acreage (landscaping/beautification) is also low. This concurrence was based upon the following:

1. Presently the current use of the lot (Imperial Heights Pump Station) poses a minimal threat to the aquifer. The one activity that could present a slight risk to the aquifer is the refueling of the backup generator at the pump station. Due to the controlled nature of the refueling activity and the limited volume of refueling required (backup source), refueling of the generator poses a minimal risk to the aquifer. The remainder of the lot is undeveloped and therefore none of the prohibited activities as identified in the City of Laramie's Unified Development Code, subsection 15.08.040.A. in Table 15.08.040.A Prohibited Activities are being conducted and the exposure to human activity is essentially non-existent.
2. The setback limitations imposed by the presence of the ephemeral drainage channel and the Quarry fault, effectively limits the potential development of this acreage to that identified in the SSI by Trihydro to landscaping and/or other beautification efforts. The risk to the Casper Aquifer will remain low as long as the necessary precautions are taken during the construction of any of these improvements and the proper type and application of fertilizer, herbicides and insecticides are adhered to.

15.08.040.A.8(d)(xiii) Demonstration of compliance with all applicable city standards.

The SSI has adequately addressed and identified the requirements as mandated by this section of the City of Laramie's Unified Development Code.

If you have any questions, please do not hesitate to call.

Respectfully submitted,
Wester-Wetstein & Associates, Inc.



John Wetstein

