AQUA ENGINEERING

Project Memorandum

To	Shay Stark, Contract City Planner
From	Craig Neeley, P.E., Contract City Engineer
Date	September 19, 2016
CC	
Subject	Harrison Heights Phase 9 – Source Protection for Highline/Cloward Well

Per our discussion yesterday I reviewed the source protection requirements for the Highline/Cloward Well and how the source protection goals for the well may be impacted by the proposed Harrison Heights Phase 9 subdivision.

Regulatory Authority

The original Cloward Well was completed prior to 1993 and it predates the regulatory requirement for source protection which extends through the U.S. EPA to the State of Utah and its Division of Drinking Water (UDDW). This is true even though the replacement well currently in use was drilled after 1993 because the newer well qualifies as an official replacement of the original well as defined by the Utah Division of Water Rights and the UDDW. Nevertheless, protecting public drinking water sources from contamination is essential which is why there is a source protection plan in place for the Highline/Cloward well. The plan includes provisions for minimizing potential contamination sources and using best management practices to control existing potential contamination sources in Zones 1 through 4; Zones 1 and 2 being the most critical from a source protection perspective.

Source Protection

For the Highline/Cloward Well, Zone 1 is defined as a 100' radius around the well head. Zone 2 is defined by the hydrologic characteristics of the underlying aquifer, the construction and configuration of the well, and its diversion capacity. Attached is a scan of a portion of the delineation map from the drinking water source protection plan for the well on which Zone 2 is highlighted in green. As you can see, portions of Doe Hill and Harrison Heights Phases 5, 7, and 9 lie within Zone 2.

As the city engineer I have tried to balance the source protection goals for this well with the subsurface conditions. Attached is a scan of the well log on which the low permeability zones above the static water level are highlighted. As you can see there are over 160' of low permeability layers above the static water level which provide a significant degree of protection against contamination from the surface.

For Harrison Heights Phase 9 the City has required the applicant to eliminate storm water sumps (Class V injection wells) and to detain storm water runoff in a lined impermeable basin

adjacent to the well site. In addition, all sewer lines in this area have been air tested to confirm the pipes and joints are watertight and competent.

The presence of residential lots within Zones 1 and 2 present a minimal threat to the aquifer and it is particularly difficult to regulate the use of pesticides, herbicides, and other household chemicals in residential settings. Typically, residential use and storage of chemicals will be well below "reportable" thresholds established by 40 CFR 302 (pursuant to Section 311 of the Clean Water Act). The rationale is that the impact of household chemicals on water resources can be minimized through monitoring and public outreach and education.

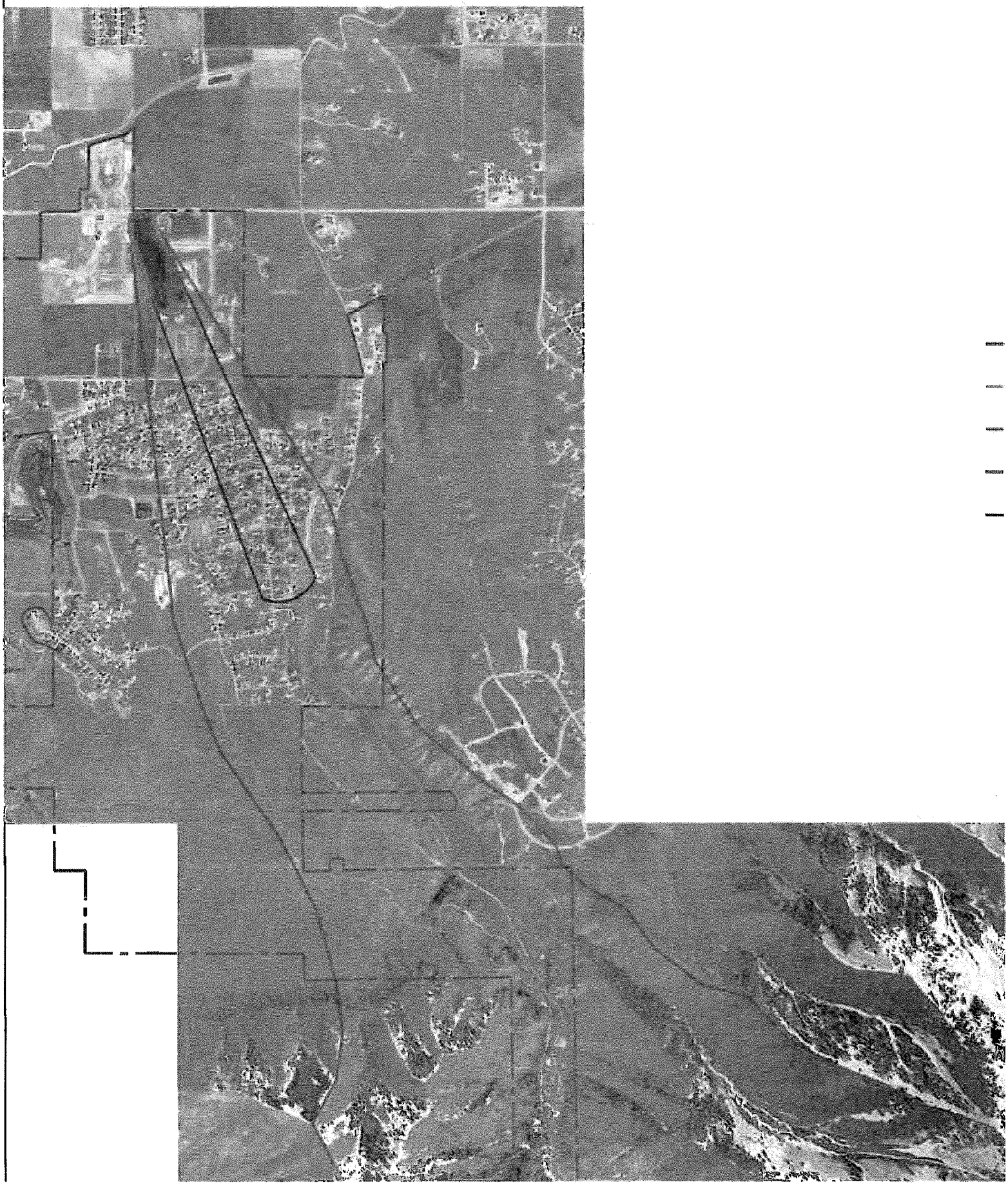
Recommendation

If the Harrison Heights Phase 9 project receives final approval I see no reason to believe the source protection goals for the Highline/Cloward Well cannot be met. My recommendation is to require the applicant to add the boundary for Zone 1, delineated by a 100' radius around the well head, to the final plat along with the following disclosure verbiage for Lot 54:

> "Portions of this lot lie within source protection Zone 1 of a public drinking water well and are subject to State of Utah and Utah County source protection requirements"

Consideration should also be given to promoting best management practices system wide by periodically providing source protection information on the City's website and enclosing it in billing statements.

-END-



WELLPRT Well Log Information Listing

Version: 2003.09.18.00 Rundate: 10/13/2003 03:40 AM

Utah Division of Water Rights

Water Well Log

LOCATION:
S 24 ft E 39 ft from N4 CORNER of SECTION 23 T 9S R 2E BASE SL Elevation: feet

DRILLER ACTIVITIES:
ACTIVITY # 1 WELL ABANDONMENT
DRILLER: BEEMAN, BOB (DRILLING COMPANY) LICENSE #: 396
START DATE: / / COMPLETION DATE: / /
ACTIVITY # 2 WELL REPLACEMENT
DRILLER: BEEMAN, BOB (DRILLING COMPANY) LICENSE #: 396
START DATE: 10/24/2002 COMPLETION DATE: 12/13/2002

BOREHOLE INFORMATION:

Depth(ft) From	Depth(ft) To	Diameter(in)	Drilling Method	Drilling Fluid
0	55	48	AUGUER	NONE
55	110	23	CONVENTION/DIRECT	BENTONITE,MUD,WATER
110	985	23	FLOODED REVERSE RTRY	BENTONIE,MUD,POLYMER

LITHOLOGY:

	Depth(ft) From	Depth(ft) To	Lithologic Description	Color	Rock Type
	0	5	LOW-PERMEABILITY,CLAY,SILT SAND & CLAY	DK. BROWN	TOPSOIL
10'	5	15	LOW-PERMEABILITY,CLAY,SAND CEMENTED SAND & CLAY	YELLOW/TAN	CALEACHAY
17'	15	32	LOW-PERMEABILITY,CLAY,SAND,GRAVEL SAND & GRAVELS	TAN	ALLUVIUM
	32	47	HIGH-PERMEABILITY,SAND,COBBLES,BOULDERS UNCONSOLIDATED 6"-12" COBBLES & BOULDERS	TAN/GRAY	ALLUVIUM
38'	47	85	LOW-PERMEABILITY,CLAY,SILT,GRAVEL THICK CLAY WITH GRAVEL	BROWN/TAN	ALLUVIUM
	85	105	HIGH-PERMEABILITY,SAND,GRAVEL,COBBLES SAND MIXED WITH GRAVEL & COBBLES	GRAY/MULTI	ALLUVIUM
	105	115	HIGH-PERMEABILITY,SAND,GRAVEL,COBBLES,BOULDERS UNCONSOLIDATED SAND, GRAVEL AND COBBLES	GRAY/BLACK	ALLUVIUM
	115	132	HIGH-PERMEABILITY,SAND,GRAVEL,COBBLES UNCONSOLIDATED COARSE SAND WITH COBBLES AND BOULDERS	GRAY/BLACK	ALLUVIUM
6'	132	138	LOW-PERMEABILITY,CLAY,GRAVEL THICK CLAY MIXED WITH GRAVEL (25%)	TAN	ALLUVIUM
37'	138	175	LOW-PERMEABILITY,CLAY,SAND,GRAVEL,COBBLES SAND, GRAVEL, AND COBBLES WITH CLAY LAYERS		
	175	190	HIGH-PERMEABILITY,GRAVEL,COBBLES,BOULDERS CEMENTED GRAVEL, COBBLES AND BOULDERS	GRAY/BLACK	ALLUVIUM
25'	190	215	LOW-PERMEABILITY,SAND,GRAVEL SAND AND GRAVEL WITH LAYERS OF CLAY	GRAY/TAN	ALLUVIUM
30'	215	245	LOW-PERMEABILITY,CLAY,GRAVEL,COBBLES THICK CLAY WITH GRAVEL AND COBBLE LAYERS	TAN/BROWN	ALLUVIUM
IL 280'	245	295	WATER-BEARING,HIGH-PERMEABILITY,SAND,GRAVEL,COBBLES	GRAY	ALLUVIUM