GROUNDWATER, WELLS AND SPRINGS EVALUATION

Wisconsin Department of Transportation

FACTOR SHEET C-4

Alternative	Total Length of Center Line of Existing Roadway Length of This Alternative
Preferred ☐ Yes ☐ No ☐ None identified	

1. **Groundwater Protection Elements in Comprehensive Land Use Planning and Transportation:**
   A. Is project located in an area that has or is developing a:

Groundwater Plans, Programs and Ordinances	Yes	No
WDNR Approved Well Head Protection Plan		
WDNR Source Water Assessment		
Groundwater Management Plan		
Ordinance to protect wells, aquifers or sensitive groundwater recharge zones?		
Wisconsin Groundwater Guardian Community Program		

If yes, explain and describe future coordination needs for each category, above:
Contact the local municipal engineer, county, regional planning commission, UW-Extension Agent, and WDNR Regional Contact for Water Supply
http://www.dnr.state.wi.us/org/water/dwg/gw/whp/contacts.htm.
See following websites:
List of Well Head Protection Program participating communities
http://www.dnr.state.wi.us/org/water/dwg/gw/whp/communities.pdf
Wellhead Protection
http://www.dnr.state.wi.us/org/water/dwg/gw/Wellhead.htm
Source Water Assessment
http://www.dnr.state.wi.us/org/water/dwg/swap/index.htm
Water System Info & Maps
http://www.dnr.state.wi.us/org/es/science/publications/SS_988_2003.pdf
Wisconsin Groundwater Guardian Communities
http://www.uwsp.edu/cnr/gwguardian/
Protecting Wisconsin's Groundwater Through Comprehensive Planning
http://wi.water.usgs.gov/gwcomp/

B. Will project location, or likely infrastructure, construction method or stormwater management practices encroach upon or affect protected areas or well locations resulting in non-compliant Plans or wells? Note, there are minimum separation distance requirements for wells, springs, depth to bedrock, and karst features in State Codes (see NR 151, Trans 401, NR 809, NR 811, and NR 812)?

☐ No - Explain why:
☐ Yes - Explain why:

See the following links:
Wellhead Protection Ordinances - http://www.dnr.state.wi.us/org/water/dwg/gw/whp/WHP_ORDA.pdf
Wisconsin Admin. Codes -
http://folio.legis.state.wi.us/cgibin/om_isapi.dll?clientID=41998268&infobase=code.nfo
WDNR Drinking Water and Groundwater Homepage - http://www.dnr.state.wi.us/org/water/dwg/
USGS Wisconsin Water Division - http://wi.water.usgs.gov/
UW Water Resource Institute - http://www.wri.wisc.edu/
Central Wisconsin Groundwater Center - http://www.uwsp.edu/cnr/gndwater/
Portage County Groundwater - http://www.uwsp.edu/water/portage/manage/mgtplan.htm
Wisconsin Geologic and Natural History - http://www.uwex.edu/wgnhs/index.html/
Wisconsin Water Policy - http://www.aqua.wisc.edu/waterpolicy
Wisconsin Water Facts - http://www.aqua.wisc.edu/waterlibrary/facts.asp
Wisconsin Water Library - http://www.aqua.wisc.edu/waterlibrary/
Karst feature links – http://www.uwex.edu/wgnhs/karst.htm
http://www.uwex.edu/wgnhs/karstmap.htm
http://basineducation.uwex.edu/rockriver/documents/2005karst.pdf
http://www.agiweb.org/environment/karstmap.pdf

C. Does the proposed alternative conflict with items described in A, above?

☐ No - Explain why:

☐ Yes - Explain why:

When a proposed project encroaches on a wellhead protection area, the draft EIS should identify the area, the potential impact of each alternative and proposed mitigation measures. If the preferred alternative impacts these areas, the final EIS should document that it complies with the approved State wellhead protection plan (Oct 30, 1987 FHWA Guidance T 6640.8A).

D. Have the local units of Government, businesses or property owners been notified of potential conflicts with items described in A or B?

☐ No

☐ Yes - Explain:

E. How will the project avoid, minimize or mitigate potential impacts?

Per FHWA guidance, the NEPA document should characterize water resources in a watershed context that includes surface water, ground water, wellhead protection areas, source water protection areas, soils, topographic features affecting basin hydrology, existing water quality conditions and land use patterns affecting runoff conditions. If none of the alternatives affect the aquifer, the requirements of the Safe Drinking Water Act are satisfied. If an alternative is selected which affects the aquifer (or Wisconsin Groundwater Quality Standards), a design must be developed to assure, to the satisfaction of WDNR, that it will not contaminate the aquifer (40 CFR 149). Note, Wisconsin has authority from EPA to administer Water Programs. Wisconsin does not designate specific areas as EPA "sole source aquifers" but rather regulates all groundwater equally. So there is no groundwater classification in Wisconsin (like there is in surface water bodies) and so there is not a regulatory distinction between hydrogeologic aquifers, aquitards, aquicludes or aquifuge.

2. Identification and Inventory of Wells:

A. Identify wells located within existing and proposed right of way of proposed alternative and provide date of well inventory survey (__/__/__):

Well Category	# in existing ROW	# in proposed ROW
Private Potable Wells	___	___
Municipal High Capacity Wells	___	___
Industrial or Agricultural Wells	___	___
Community Shared Wells	___	___
Groundwater Monitoring Wells	___	___
Research Monitoring Wells	___	___
Free flowing or artesian Wells	___	___
Other (describe)	___	___

B. Will the proposed alternative interfere or damage well locations or use? Is there potential for physical damage to the wells, alteration of pumping capacity, or degradation of water quality produced from the wells?
Property owners commonly have concerns about well damage as result of rock cut, pile-driving or blasting operations. Depending on the situation, it may be in best interest of WisDOT to do some or all of the following:

1. *Obtain well log (if there is one) from property owner or order from WGNHS.*
2. *Inspect site and take pictures of well and cistern and any building foundations. If there is a critical need to be thorough then consider taking a down hole video of well before and after construction.*
3. *Interview property owners (or rental parties) to learn about well and water quality characteristics currently and historically (e.g., does well water normally get turbid or have poor taste temporarily during spring snow melt period or after major storm events).*
4. *Create special provisions restricting rock cut operation methods or blasting charges, etc.*
5. *Use vibration monitors and collect data during construction/rock cut operations to document influence of operations (for help contact WisDOT Geologist, Dan Reid, 608-246-7946).*
6. *Collect pre-construction water quality samples for natural chemistry parameters for a baseline reference (3 rounds if we want to be somewhat thorough) and then collect some post construction samples.*

C. Identify the number and type of wells that will likely need to be abandoned and describe how that will be coordinated and who will be responsible to abandon the wells per State code? This must be listed as an environmental commitment.
See well abandonment procedures and codes: NR 141.21; NR 811.10; NR 811.17; NR 812.26 and WisDOT Standard Specifications for Highway and Structure Construction 204.3.3.3 Abandoning Wells.
In addition to potable wells, it is particularly important to identify and plan for the future removal and proper abandonment of NR 141 Groundwater Monitoring Wells. These are most commonly associated with petroleum contaminated sites (gasoline service stations) or other contaminated properties. There are usually several wells near major highway intersections or numerous wells along or in ROW in urban areas.

3. Identification and Inventory of Springs:

See the following links:
http://dnr.wi.gov/org/water/dwg/gac/presentations/Bradbury060106update.pdf - WI Springs Project Update
http://www.wri.wisc.edu/Downloads/Projects/Final_WR05R004.pdf - assessing the Ecological Status and Vulnerability of Springs in Wisconsin
http://www.madison.com/wsj/topstories/index.php?ntid=205850&ntpid=1 - Wisconsin's Silent Springs: Demand is reducing water levels.
http://www.uwex.edu/wgnhs/current.htm - WGNHS Open File Report 2007-03 regarding Springs Mapping in Wisconsin.

A. Are there known springs in or adjacent to the proposed project limits?
- ☐ None identified
- ☐ Yes, explain how many and describe characteristics and location of springs:

B. Is there a spring critical for an outstanding resource water (ORW), exceptional resource water (ERW), a cold-water fishery (trout stream), a sensitive aquatic habitat, a calcareous fen, a wetland, or other outstanding natural resources and endangered species?
- ☐ None identified
- ☐ Yes - How many and explain:

C. Will the proposed alternative and likely grade changes, stormwater management practices, or construction methods affect a spring location, flow rate, or water chemistry (e.g., blasting, filling, cut-sections, drain pipes, structure placement, driving foundation footings or cofferdams, reducing infiltration to spring, etc)?
- ☐ No
- ☐ Yes - Explain (temporary or permanent affect?):

D. Describe coordination with the WDNR, Federal Resource Agencies, and local Government or other interest groups. How will spring impacts be avoided, minimized or mitigated?

4. **Groundwater Flow Conditions, Changes and Potential Impacts:**

There are a variety of ways groundwater flow conditions can change as a result of highway design or construction, below are just a couple examples:
Dewatering impacts due to road cuts, under-drains, storm or sanitary sewer installation, or stream rerouting can impact adjacent springs, wetlands, ponds, or building foundations (e.g., State vs Michels Pipeline Const., Inc. 1976 WI Supreme Court).
Increased groundwater level impacts due to WisDOT activity, possible examples include: at wetland mitigation sites where tiles are disabled and ditches filled; or stormwater routing to new potential recharge areas; or focused discharge from under-drains. It is relatively common for adjacent property owners to be concerned about excess water on their property (or in their basements).
Decreased groundwater level impacts due to highway design that reduces groundwater recharge area. For example a significant increase in paved surfaces from the highway or adjacent land development (expansive parking lots and paved surfaces).
Groundwater flow diversion examples include: placing fill below the water table in an area resulting in significant contrast in permeability. Another example may be placing clay fill in wetland peat as part of EBS fill for a roadway preventing the normal flow situation that previously existed. For one project we specified washed stone in a geotextile surround for the EBS fill so that flow would be maintained. Deep storm sewer trench excavations backfilled with granular material can act as groundwater drains with unforeseen impacts if not considered during design. Of course they can also serve as contaminant migration pathways.

A. Are there likely construction de-watering needs?
- ☐ No
- ☐ Yes - Explain duration of de-watering and likely pumping rates:

Although probably uncommon, IF a construction dewatering well is likely needed to pump at a high capacity (>100,000 gpd) and it is located in a State designated groundwater protection area, or groundwater management zone, or has a high water loss (>95% of amount withdrawn), or is near a concentrated groundwater discharge area/spring (flow rate of 1 cfs at least 80% of time), then WDNR has authorization to require a high capacity well permit applicant to submit an environmental impact report. A State designated groundwater protection area includes: an area within 1,200 ft of an outstanding or exceptional resource water (e.g., Class I or II Trout Streams and designated Wild and Scenic Rivers). The WDNR rules for the 2004 Wisconsin Groundwater Quantity Law (AB 926) is being developed by WDNR and unavailable at this time (2/9/06).

B. Will construction dewatering affect known groundwater contamination migration from leaking underground storage tanks or pumps islands at gasoline service stations or other contaminated properties?
   - ☐ No
   - ☐ Yes - Explain:

C. Will there be a need to consider alternative highway design (exception to standards) or construction methods to avoid, minimize or mitigate groundwater flow impacts?

Examples of concern for changing groundwater flow conditions include: drying up springs and wetlands, reducing groundwater flow rates to stream base-flow or springs, reducing groundwater recharge to sensitive environments or endangered resources, or causing contamination (e.g., petroleum or other) to migration to new locations (e.g., dissolved chemicals or gas vapors to buildings or other infrastructure).

All environmental commitments must be listed on Basic Sheet 8, Environmental Commitments.

Some unique springs or springs in unique geographical settings might have cultural significance to American Indians (e.g., springs and wetlands around Crandon, WI). Although unlikely for most projects, remember that coordination with American Indian tribes regarding springs may become necessary.