GROUNDWATER, WELLS AND SPRINGS Factor Sheet

06-11-2019 Wisconsin Department of Transportation

Alternative:	Preferred: ☐ Yes ☐ No ☐ None identified	Project ID:

For questions contact the Region Environmental Coordinator (REC) or the Bureau of Technical Services, Environmental Services Section (BTS-ESS) specialist.

A separate Factor Sheet should be completed for each alternative carried forward for detailed analysis with potential impacts to Groundwater, Wells and Springs, unless impacts are identical between alternatives, in which case clarify in the Alternatives box above which alternatives are included in the discussion on this sheet.

When applicable, the information on this Factor Sheet should be consistent with what is included on the Environmental Document Template, Wetlands Factor Sheet, Erosion Control Factor Sheet, Stormwater Factor Sheet and any other relevant factor sheets. Additionally, Habitat and Tribal Factors may need to be addressed on the Other Factor Sheet. If there is discussion of indirect or cumulative impacts on this Factor Sheet, be sure they are also reflected in the indirect impacts and cumulative impacts discussion in the environmental document.

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
DNR Approved Well Head Protection Plan	☐	☐
Groundwater Management Plan	☐	☐
Ordinance to protect wells, aquifers or sensitive groundwater recharge zones	☐	☐
Wisconsin Groundwater Guardian Community Program	☐	☐

*If yes, explain and describe coordination needs for each category above:

*Coordination is attached as:

The 1986 amendments to the federal Safe Drinking Water Act (SDWA) established a nationwide program to protect groundwater used for public water supplies through establishment of state wellhead protection (WHP) programs. The goal of WHP is for communities to delineate and protect the land area, which contributes water to their wells to prevent contamination of their water supply wells. Wisconsin's WHP program, approved by the U. S. Environmental Protection Agency (EPA) in 1993, has a regulatory and a voluntary component. The results of these assessments are to be made available to the public.

See https://dnr.wi.gov/topic/groundwater/ for overall DNR groundwater references.

See https://dnr.wi.gov/topic/DrinkingWater/SourceWaterProtection.html and then contact the local DNR drinking water and groundwater staff https://dnr.wi.gov/topic/DrinkingWater/documents/CountyContacts.pdf to learn status of plans.

Contact the local municipal engineer (or water system operator), county planning department and regional planning commission to determine status of existing or proposed plans which local DNR staff may not know about.

See https://docs.legis.wisconsin.gov/code/admin_code/nr/800/820/ for Groundwater Quantity Protection and listing of groundwater management area designations.

See http://www.groundwater.org/action/community/ggdirectory.html click on Groundwater Guardian Profiles and scroll to Wisconsin to see the current list of communities and contacts. Longtime WI Groundwater Guardian Communities include: Calumet County, Chippewa Falls, Kewaunee County, Marshfield area, and Milladore area.

See https://wi.water.usgs.gov/gwcomp/ Protecting Wisconsin's Groundwater Through Comprehensive Planning

B. 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 or sensitive groundwater recharge zone; the document should identify the area, the potential impact of each alternative, and proposed mitigation measures. If the preferred alternative is selected for these areas, the final environmental document should document that it complies with the approved State wellhead protection plan (Oct 30, 1987 FHWA Guidance T 6640.8A).

C. 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 811, NR 812, NR 820)?
   ☐ No, explain why:
   ☐ Yes, explain why:

See http://docs.legis.wisconsin.gov/code/admin_code Wisconsin Admin. Codes
See https://dnr.wi.gov/topic/drinkingwater/code.html WI Drinking Water Administrative Code listing

D. Have the local units of Government, businesses or property owners been notified of potential conflicts with items described in A, B or C?
   ☐ No
   ☐ Yes, explain:
   Coordination is attached as:

E. How will the alternative avoid, minimize or mitigate potential impacts? Briefly describe here and include in Question 23 of the ER and EA Template, Section 5 of the PCE Template or Question XII of the CEC Template:

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 (40 CFR 149) are satisfied.

If an alternative is selected which affects the aquifer, a design must be developed to assure, to the satisfaction of DNR, that it will not contaminate the aquifer.

Note, Wisconsin has authority from EPA to administer Water Programs. Wisconsin does not designate specific areas as EPA "sole source aquifers" (SSA) but rather regulates protection of all groundwater statewide to prevent pollution of drinking water aquifers (Wisconsin Groundwater Quality Standards – NR 140). However, any individual, corporation, company, association, partnership, state, municipality, or federal agency may petition EPA for SSA designation.

See https://docs.legis.wisconsin.gov/code/admin_code/nr/100/140.pdf#page=14 NR 140 Groundwater Quality

2. Identification and Inventory of Wells:

A. Identify wells located within existing and proposed right of way of the 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		
Free flowing or artesian wells		
Other, describe:		

Date of well inventory survey:

Coordination is attached as:

See https://dnr.wi.gov/topic/Wells/

See https://groundwaterwatch.usgs.gov/statemap.asp?sc=55&sa=WI

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? Describe:

Property owners commonly have concerns about water quality and well damage as result of rock cut, pile-driving or blasting operations. In unique circumstances, it may be in DOT's best interest to do some or all the following:

1. Obtain well log (if there is one) from property owner or https://dnr.wi.gov/topic/Groundwater/data.html#wellreports or http://geodata.wgnhs.uwex.edu/well-viewer/
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? Does well pump capacity vary often? How old is the pump?).
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 DOT DTSD BTS Geotechnical Unit Geologist).
6. Collect pre-construction water quality samples for natural chemistry parameters for a baseline reference (3 rounds 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 filled and sealed and describe how that will be coordinated and who will be responsible to fill and seal the wells per State code: These must be included in Question 23 of the ER and EA Template, Section 5 of the PCE Template or Question XII of the CEC Template.

See well fill and seal procedures and codes: NR 141; NR 811; NR 812 and WisDOT Standard Specifications for Highway and Structure Construction 204.3.3.3 Abandoning Wells. https://wisconsindot.gov/rdwy/stndspec/ss-02-04.pdf

In addition to potable wells, it is particularly important to identify and plan for protection, future removal, and proper filling and sealing of NR 141 Groundwater Monitoring Wells. These are commonly associated with petroleum contaminated sites (gasoline service stations) or other contaminated properties (landfills, industrial sites, bulk oil plants, etc.). There are usually several wells near major highway intersections or in ROW in urban areas.

3. Identification and Inventory of Springs:

If springs are identified during your project, cc this form to the BTS-ESS Specialist (robert.pearson@dot.wi.gov).

Springs are protected for ecological, cultural and groundwater resource reasons by multiple regulations. From the groundwater withdrawal protection regulation aspect, DNR has funded Wisconsin Geologic Natural History Survey (WGNHS) to perform an ongoing Statewide Springs Inventory focusing on identifying springs that produce flow rates of about 70 gallons per minute (gpm) or 100,000 gallons per day (gpd) most of the time. Presently WGNHS has mapped about 415 "large springs" (springs producing 0.25 cubic feet per second (cfs) or at least 110 gpm equivalent). These springs are found in 58 counties throughout the State with an average flow rate of 0.96 cfs and many are in road ROW. DOT contributes spring location information to WGNHS when discovered during projects.

See https://wgnhs.uwex.edu/water-environment/springs/ for spring descriptions, statewide inventory (on-going), database, story map and publications.

See https://www.youtube.com/watch?v=WQ0izzOZ1es Mapping the Springs of Wisconsin. Published for Wisconsin Public Television and UW Wednesday Nite @ the Lab https://science.wisc.edu/wednesday-nite-at-the-lab/ (Sue Swanson from Beloit College and Grace Graham from the Wisconsin Geological Survey will present their project in mapping springs of Wisconsin).

Spring classification systems are not uniform. Scientific and/or common terms used to describe spring types include: rheocrene, limnocrene, helocrene, gravity depression, contact gravity, seepage, artesian, karst (sinkhole or cave), fractured bedrock, fissure, joint bedrock, perennial, intermittent, tubular, thermal, fault, streambank or stream boil, sand boil.

Note, some springs or springs in unique geographical settings might have cultural significance. Coordination with tribes regarding springs may be necessary within the ceded territories but particularly within reservation boundaries. In addition to the tribes, other stakeholders may have a cultural interest in springs.

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, include map location if used:

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 or endangered species?
   - ☐ None identified
   - ☐ Yes, how many and explain:
     Coordination is attached as:

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 and/or permanent effect?):

D. Describe coordination with the DNR, Federal Resource Agencies, Tribal Government(s) and local Government(s) or other interest groups: , coordination is attached as:

E. How will spring impacts be avoided, minimized or mitigated:

4. Groundwater Flow Conditions, Changes and Potential Impacts:

It is standard engineering practice in development of sustainable transportation infrastructure to understand, interpret, and anticipate: depth to groundwater, drainage, and subsurface dewatering needs (permanent or temporary). This is particularly true for major projects with significant grade changes (cut and fill sections), multiple drainage modifications and structure placement.

There are a variety of ways groundwater flow conditions can change (transient or permanent) because of infrastructure 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 groundwater table elevations, springs, wetlands, ponds, or building foundations (e.g., State vs Michels Pipeline Const., Inc. 1974 Wisconsin Supreme Court).

Increased groundwater level impacts due to DOT 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 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, possible examples include: a significant increase in paved surfaces from the highway or adjacent land development.

Groundwater flow alteration examples include: placing fill below the water table in an area resulting in significant contrast in permeability. Granular backfilled sewer and utility installations in general can also alter flow and produce contaminant migration pathways.

A. Are there likely construction dewatering needs?
   - ☐ No
   - ☐ Yes, explain duration of dewatering and likely pumping rates:

If a construction dewatering well (or combination of wells) is needed for the project to pump at a high capacity (>100,000 gallons per day) 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 cubic feet per second at least 80% of time); then DNR has authorization to require a high capacity well permit applicant (typically the Highway Contractor) 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 and some Trout Streams (see NR 820).

The DNR may approve a high capacity well without preparing an environmental analysis if they determine the construction and operation of proposed well will not result in significant adverse environmental impact.

"Significant adverse environmental impacts" means alterations of groundwater levels, groundwater discharge, groundwater temperature, surface water chemistry, or other factors to the extent such alterations cause significant degradation of environmental quality including biological and ecological aspects of affected water resource (NR 820.12(19)).

Temporary dewatering of a single construction site in unconsolidated deposits in which the duration of the project will not extend more than one construction season might not require extensive analysis by DNR (case specific).

Water Use Permits are required for Great Lakes Basin groundwater or surface water withdrawals averaging 100,000 gallons per day or more in any 30-day period. General permits (valid until 2036) are required for withdrawals of 100,000 gallons per day averaged over 30 days up to 1,000,000 gallons of water for 30 consecutive days. Individual permits (valid for 10-years) are required for withdrawals of 1,000,000 gallons per day or more for 30 consecutive days. Chapter NR 860, Wis. Adm. Code prescribes a review process for the individual permits that requires an additional environmental review.

So, it is important for the DOT design and construction team (and Highway Contractors) to anticipate likely construction dewatering needs (or high capacity well needs for DOT facilities or other construction activities – Portable Asphalt/Concrete Batch plants) and how it fits into the Groundwater Quantity Protection regulations and Great Lakes Compact (water withdrawal and basin transfer) if they expect the project to achieve Let and Construction schedules. Special provisions or special notices to the Contractor may be necessary on occasion. This topic has been an issue for some projects and contractors.

See https://dnr.wi.gov/topic/Wells/HighCap/index.html
See https://dnr.wi.gov/topic/WaterUse/
See https://dnr.wi.gov/topic/WaterUSe/Compact.html

B. Will construction dewatering affect known groundwater contamination migration from leaking underground storage tanks or pump 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? Explain:

D. If applicable, describe coordination with the DNR, Federal Resource Agencies, and local Government(s) or other interest groups: , coordination is attached as:

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

All environmental commitments made to avoid, minimize or compensate for impacts must be included in Question 23 of the ER and EA Template, Section 5 of the PCE Template or Question XII of the CEC Template.

Other useful regulatory references:
https://www.environment.fhwa.dot.gov/legislation/nepa/guidance_preparing_env_documents.aspx FHWA T 6640.9A
https://docs.legis.wisconsin.gov/statutes/statutes/160 Chapter 160 Groundwater Protection Standards
https://docs.legis.wisconsin.gov/statutes/statutes/281/III/34 Groundwater Withdrawals
https://docs.legis.wisconsin.gov/statutes/statutes/281/III/343 Great Lakes Compact
https://www.epa.gov/tribal/tribes-approved-treatment-state-tas#regulatory-and-administrative-tas Tribes Approved
https://dnr.wi.gov/topic/groundwater/gcc/ Wisconsin Groundwater Coordinating Council (DOT Member)
https://dnr.wi.gov/topic/Groundwater/documents/GCC/AgencyActivities/DOTactivities.pdf DOT GCC Report
https://datcpgis.wi.gov/maps/?viewer=dd DATCP Drainage Districts
https://dnr.wi.gov/topic/Wells/UIW.html DNR Underground Injection Wells

Other useful general references:
https://dnrmaps.wi.gov/H5/?viewer=Water_Use_Viewer Wisconsin Water Use Viewer
https://dnr.wi.gov/dwsviewer Public Water System Viewer
https://www.usgs.gov/centers/wisconsin-water-science-center/ USGS Wisconsin Water Division
https://water.usgs.gov/ogw/pubs.html USGS Groundwater Publications
https://water.usgs.gov/nawqa/studies/gwtrends/ - USGS NAWQA Groundwater-Quality Trends
https://www.usgs.gov/centers/wisconsin-water-science-center/science/evaluating-chloride-trends-due-road-salt-use-and-its?qt-science_center_objects=0#qt-science_center_objects Chloride Trends & Aquatic Organisms
https://pubs.usgs.gov/sir/2004/5150/ Deicing Chemicals on Shallow Unconsolidated Aquifers
https://waterdata.usgs.gov/wi/nwis/current?type=flow Current Conditions for Wisconsin Streamflow
http://www.aos.wisc.edu/~sco/clim-watch/water.html Wisconsin State Climatology Drought Index
http://www.wri.wisc.edu/ UW Water Resource Institute
https://www.uwsp.edu/cnr-ap/watershed/Pages/default.aspx UWSP Center for Watershed Science & Education
https://datcp.wi.gov/Pages/Publications/AgrichemicalManagementBureau.aspx DATCP Groundwater Wells
https://waterlibrary.aqua.wisc.edu/ UW Water Library