Accelerating Project Delivery and Enhancing Quality of Life Using Context Sensitive Solutions:

A Case Study of the Watford City Bypass

Showcasing transportation project success in rural North Dakota

U.S.Department of Transportation
Federal Highway Administration

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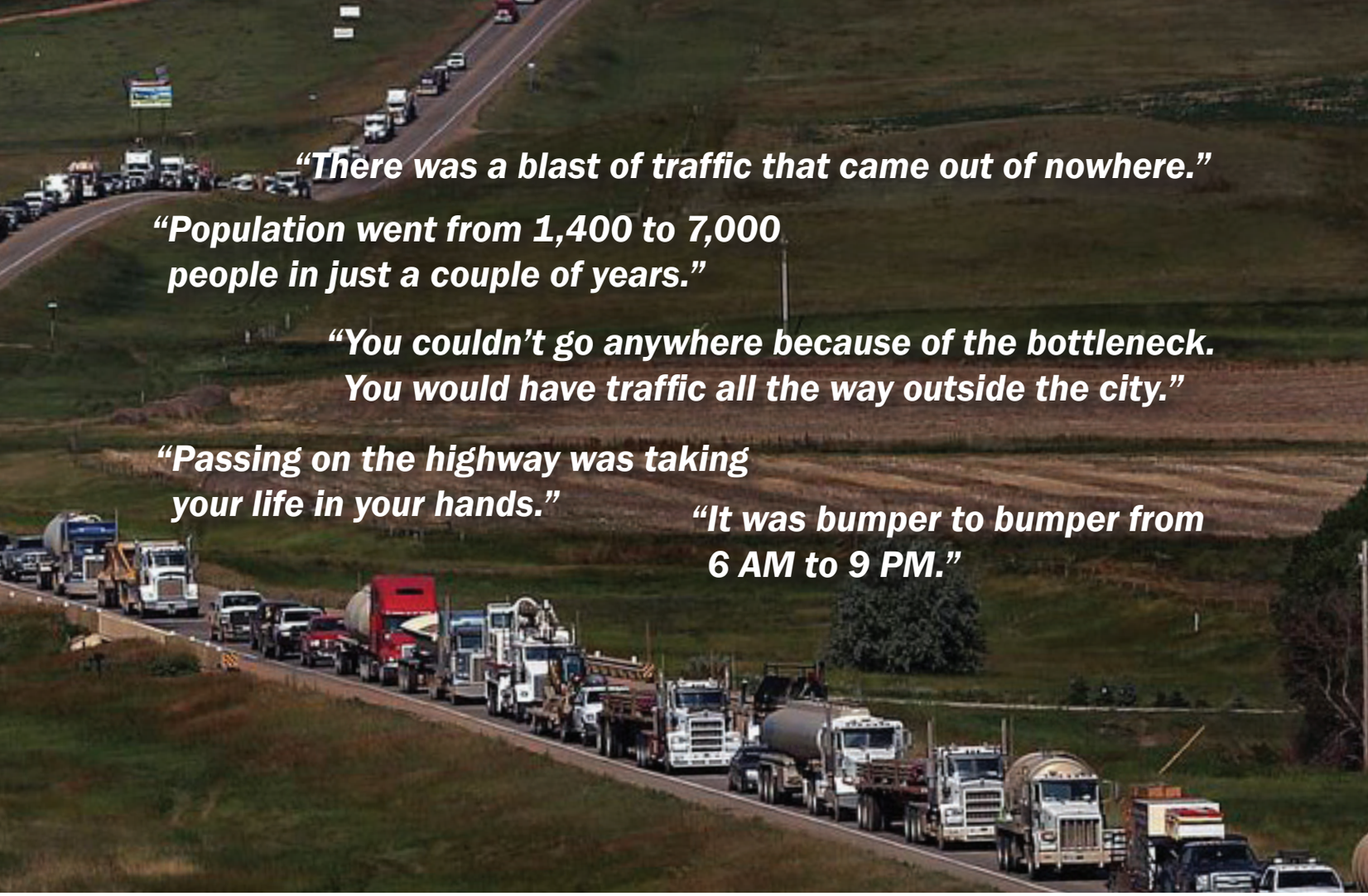
Front cover: Overhead view of the Watford City bypass. *Source: americantransportawards.com*
Inside and back cover: Main Street in Watford City today. *Source: MckenzieCounty.net*



Traffic headed east through Watford City, prior to the bypass. Source: Startribune.com

Introduction

These quotes describe the dramatic changes experienced by Watford City as the oil boom took hold in western North Dakota in the late 2000s. As new workers rushed into the region, Watford City's downtown was overrun with continuous truck traffic and its populace confronted a sudden housing shortage. The jump in traffic exceeded the capacity of the highways in and out of Watford City, increased travel times, and greatly reduced mobility in the area. Faced with the urgent need to find a solution, the North Dakota Department of Transportation (NDDOT) successfully leveraged context sensitive solutions (CSS) principles to quickly plan and build a bypass around the city. The bypass proved to be an effective solution that not only resulted in substantial traffic safety improvements, but also facilitated improved quality of life for Watford City residents.

Through proactive public involvement, NDDOT encouraged the Watford City community to provide input and gain a sense of ownership of the bypass project. NDDOT collaborated with State resource agencies to expedite environmental approvals and cut down on review time. The project management strategy used by NDDOT accelerated decision-making and project delivery processes. In addition, the strong relationship NDDOT has formed with the tribes in the State allowed the department to effectively address tribal concerns while still achieving its transportation project goals. The following case study tells the story of how NDDOT used a CSS approach to expeditiously deliver a transportation project which helped transform Watford City and dramatically improve quality of life.

Unprecedented Growth: Understanding the Context

Prior to the expansion of oil operations in the Bakken shale formation, Watford City was in decline. Many of those who grew up on the surrounding farms often left for cities with more opportunity. At the onset of the boom, the city experienced a dramatic growth generated by an influx of workers and corresponding traffic congestion.

In the late 2000s and early 2010s, North Dakota was the nation's second highest producer of crude oil, behind Texas, as oil companies drew roughly 1 million barrels of oil each day.[1] The sharp increase in oil production was accompanied by a spike in traffic, particularly in the oil-producing counties in western North Dakota. Between 2010 and 2012, at the height of the oil boom, roadway traffic in North Dakota increased by 22 percent. In the western half of North Dakota, the increase was 53 percent.[2] The daily count of vehicles on U.S. Highway 85 west of Watford City grew from 2,322 in 2006 to 11,051 in 2012 – representing roughly a 375 percent increase.[3]

Intersection of Highway 85 and Main Street in Watford City, prior to the bypass. *Source: intersectionjournal.com*

Watford City, located in oil-producing McKenzie County, directly experienced the impact in and around its downtown. There was heavy traffic comprised of medium- and heavy-duty trucks throughout the day because each of the 1,800 - 3,000 oil wells drilled in the Bakken required 2,300 truckloads to deliver water, sand, and other materials to the site.[4,5] In 2013, Watford City saw nearly 3,900 trucks drive through the city each day.[6] By the following year, an average of 18,625 cars passed through the intersection of Highway 85 and Main Street in Watford City daily, according to the North Dakota Department of Transportation. Compared to the average of 2,700 in 2008, this rate represented an increase of 590 percent in just six years.[7] Curt Moen, Watford City Administrator, indicated that getting in and out of Watford City took about two hours during the height of the oil boom. City Engineer Rick Jore indicated that "You couldn't go anywhere because of the bottleneck. You would have traffic all the way outside the city."

[1] Gahagan, K. (2015). "Traffic accidents an unwanted consequence of the Bakken oil boom." *Al Jazeera America,* http://america.aljazeera.com/watch/shows/fault-lines/articles/2015/1/12/traffic-accidentsanunwantedconsequenceofthebakkenoilboom.html
[2] Gahagan, K. (2015). "Traffic accidents an unwanted consequence of the Bakken oil boom." *Al Jazeera America,* http://america.aljazeera.com/watch/shows/fault-lines/articles/2015/1/12/traffic-accidentsanunwantedconsequenceofthebakkenoilboom.html
[3] Ruggles, K. (2013). "County Leads State in Traffic Fatalities." *McKenzie County Farmer,* http://www.watfordcitynd.com/?id=10&nid=2143
[4] Rao, M. (2014). "Bakken truckers often 'haul heavy.'" *Star Tribune,* http://www.startribune.com/bakken-truckers-often-haul-heavy/282092631/
[5] North Dakota Department of Mineral Resources. (2012). "Appendix H," http://www.legis.nd.gov/assembly/62-2011/docs/pdf/gs101112appendixh.pdf
[6] Shipman, N. (2014). "Two bypasses around city to be completed in fall." *McKenzie County Watford City,* http://mckenziecounty.net/News/Two-bypasses-around-city-to-be-completed-in-fall
[7] Ziemendorf, C. (2014). "How the Other Half Lives." *Intersection Journal,* http://www.intersectionjournal.com/oil-country/how-the-other-half-lives/

CONTEXT SENSITIVE SOLUTIONS (CSS)

CSS is a dynamic and effective approach to deliver transportation systems and facilities that enhance community, environmental, and economic resources. CSS allows agencies to proactively address today's transportation challenges, respond to evolving program demands, and mobilize to meet future needs.

The four CSS core principles are: (1) Strive towards a shared stakeholder vision to provide a basis for decisions; (2) Demonstrate a comprehensive understanding of contexts; (3) Foster continuing communication and collaboration to achieve consensus; and (4) Exercise flexibility and creativity to shape effective transportation solutions, while preserving and enhancing community and natural environments.

Look for the spotlight icon throughout this case study for examples of how NDDOT put these principles into practice during the Watford City bypass project.

For more information on the benefits of CSS, a timeline of CSS milestones, and an explanation of linkages between CSS and other strategic transportation programs and activities, please see https://www.fhwa.dot.gov/planning/css/.

Traffic on US Highway 85 south of Watford City, prior to the bypass. Source: NorthDakota365.wordpress.com

With unprecedented changes came unprecedented challenges. Watford City saw a dramatic jump in crashes and faced a severe housing shortage. The Rural Transportation Safety and Security Center, housed within North Dakota State University's Upper Great Plains Transportation Institute, reported that between 2006 and 2010, total crashes in the 17 so-called "oil counties" increased by nearly 70 percent, from 2,320 to 3,909.[8] In 2012, there were 48 fatalities in North Dakota involving a bus or large truck, amounting to 0.48 per 100 million vehicle miles traveled – far exceeding the rate of any other State in the country.[9] In the first three months of 2013, 30 percent of North Dakota's traffic fatalities occurred in McKenzie County.[10]

In addition to the traffic challenge, Watford City experienced a housing shortage, which resulted in negative quality of life impacts. Moen estimated that Watford City's population went from 1,400 to 7,000 in just a couple of years. Oil workers tried to make do by overcrowding in single family homes and hotels, and setting up transient camps. A 2014 article in the Intersection Journal reported, "[t]emporary trailer parks and man-camps are the norm for oil workers."[11] Nearly half of all residents in Watford City qualified as "non-permanent residents," meaning that they were employed in the city but resided in another State. Rent in nearby Williston, North Dakota, ranked as "the highest in the country, beating San Francisco, San Jose, New York City and L.A."[12] Faced with these complex and pressing challenges, Watford City and the North Dakota Department of Transportation collaborated on a bypass project that would allow trucks to go around the city, while also allowing for infrastructure development and growth downtown.

[8] Michael, J. (2012). "Number of ND traffic injuries, fatalities rose in 2011." *Bismark Tribune,* http://bismarcktribune.com/news/local/number-of-nd-traffic-injuries-fatalities-rose-in/article_ef9a3c74-34fd-11e1-be96-0019bb2963f4.html
[9] U.S. Department of Transportation Federal Motor Carrier Safety Administration. (2014). "2014 Pocket Guide to Large Truck and Bus Statistics: October 2014 Update," https://www.fmcsa.dot.gov/sites/fmcsa.dot.gov/files/docs/FMCSA%20Pocket%20Guide%20to%20Large%20Truck%20and%20Bus%20Statistics%20-%20October%202014%20Update%20%282%29.pdf
[10] Ruggles, K. (2013). "County Leads State in Traffic Fatalities." *McKenzie County Farmer,* http://www.watfordcityn.com/?id=10&nid=2143
[11] Ziemendorf, C. (2014). "How the Other Half Lives." *Intersection Journal,* http://www.intersectionjournal.com/oil-country/how-the-other-half-lives/
[12] Ziemendorf, C. (2014). "How the Other Half Lives." *Intersection Journal,* http://www.intersectionjournal.com/oil-country/how-the-other-half-lives/

Providing a Solution

NDDOT's solution to the capacity challenges and increased travel times was to construct a bypass around Watford City so vehicles could avoid passing through downtown. The Watford City bypass is comprised of two segments: a four-lane southwest bypass connecting U.S. Highway 85 to the south of the city with U.S. Highway 85 to the west of the city, and a four-lane southeast bypass connecting U.S. Highway 85 to the south of the city with North Dakota Highway 23 to the east of the city. The project was entirely State-funded and Federal Highway Administration served as the lead federal agency, ensuring that the full environmental review process was followed.

Upon receiving word of the planned bypass around Watford City, local business owners raised concerns about expected revenue losses. KLJ, the consultant for the bypass project, conducted an origin-destination study that revealed that 76 percent of regional traffic passed through Watford City without stopping. The study affirmed the bypass would not be a detriment to local businesses. Diverting the high volume of medium- and heavy-duty trucks around Watford City returned city streets to a lower volume of traffic, helping to retain economic activity from light-duty vehicles and reach a safer and more welcoming environment for pedestrians.

CSS Core Principle #1: By addressing concerns from local businesses and sponsoring an origin-destination study, NDDOT demonstrated a commitment to achieving a shared stakeholder vision as a basis for developing the solution.

Context Sensitive Design Considerations

Along U.S. Highway 85 to the north and west of the bypass location, NDDOT had implemented a "Super 2" highway design – one in which a passing lane is added to a two-lane highway every few miles – before eventually turning it into a four-lane facility. This type of design is essentially an incremental operational improvement suited for circumstances that do not allow for a full upgrade or expansion of the facility. However, this solution was deemed infeasible for the Watford City bypass project. Because the trucks on the highway were already driving at high speeds, vehicles wanting to pass would have to drive at even higher, more dangerous speeds on the limited-length passing lanes available on a Super 2 highway.

NDDOT Director Grant Levi leads the ceremonial groundbreaking for the southeast portion of the Watford City bypass. *Source: North Dakota Department of Transportation*

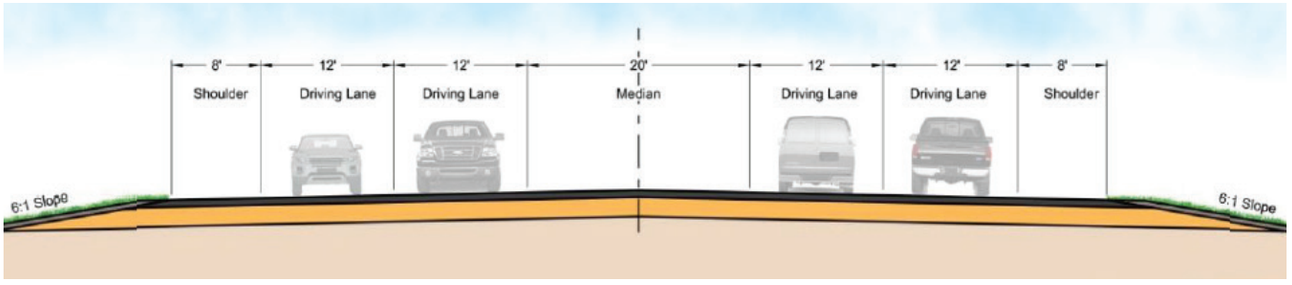
[13] North Dakota DOT. (2013). "Environmental Assessment: Watford City Bypass Route."
[14] North Dakota DOT. (2013). "Environmental Assessment: Watford City Bypass Route."

WIRELESS NETWORK ORIGIN - DESTINATION STUDY

KLJ conducted a "wireless network" origin-destination study to quantify the proportion of traffic that was passing through Watford City, versus stopping in the town. This was a relatively new strategy at the time, and it was executed using proprietary software and hardware to "collect data from mobile devices traveling through the transportation network. This method effectively converts mobile phones, headsets, music players, and navigation systems into a mobile data sensor without receiving user identifying information."[13]

The study revealed that an overwhelming majority of the regional traffic – 76 percent – continued to their destinations without making a stop in town.[14] It also showed a roughly 50/50 split between traffic continuing to U.S. Highway 85, west of Watford City, and traffic continuing to North Dakota Highway 23, east of Watford City. The study helped assuage concerns that a bypass would be a detriment to businesses.

NDDOT therefore knew the bypass needed to be a four-lane facility in order to serve the local and regional traffic, particularly since a large proportion of the traffic was made up of trucks. As detailed in the Environmental Assessment for this project, U.S. Highway 85 is classified as an Interregional System road. These roads must be highly reliable and offer high mobility in order to support economic activity. NDDOT's Design Manual reflects that Interregional System routes have daytime travel speeds averaging 60 to 70 miles per hour, and accommodating truck traffic is listed as a priority.[15]



Watford City Bypass Typical Section. *Source: Watford City Bypass Route Environmental Assessment*

ND Highway 23 is classified as a State Corridor route. These roads must have "a moderately high degree of mobility and reliability in order to support the transportation and movement of agricultural commodities, freight, and manufactured products within North Dakota." NDDOT's Design Manual reflects that State Corridors "provide connectivity between lower and higher level roadways" and have daytime travel speeds averaging 60 to 65 miles per hour.[16] Prior to the bypass project, speeds on these highways were significantly lower on the segments leading into Watford City. The stated purpose of the project, as written in the Environmental Assessment, was to "improve capacity, accommodate social demand and enhance economic development, and address transportation demand."[17]

Driven by a desire to minimize the environmental impacts of a four-lane facility, which has a large footprint, NDDOT used a flush median. Choosing the flush median also allowed NDDOT to remain flexible to future development in the area. A grass median would have required the installation of median crossings and, with no way to know exactly where future development would take place, a flush median provided more flexibility and helped meet the urgent project timeline. Rumble strips were later placed in the medians to increase safety awareness for drivers. As soon as the bypass was opened to traffic in late 2014, Travis Wieber, Project Manager for KLJ, described what he saw as "an instantaneous impact," with traffic changing "overnight."

CSS Core Principles #2 and #4: The typical section NDDOT chose for the Watford City bypass showcases a true understanding of the context, and NDDOT's flexibility in developing an effective transportation solution. By selecting a four-lane facility with a flush median, NDDOT accommodated the truck traffic along the route while reducing impact to the surrounding communities and natural environment.

The Watford City bypass was one of several road improvement and construction projects NDDOT undertook in response to the oil boom. NDDOT spent $250 million on road construction in 2012, a nearly four-fold increase from 2007. By 2014, that number had climbed to more than $800 million.[18] Together, these projects helped improve traffic flow and increase safety. In 2014, the number of fatal crashes in North Dakota dropped for the first time in three years.[19] McKenzie County also saw its traffic fatalities drop by 67% between 2013 and 2016.[20]

[15] North Dakota DOT. (2013). "Environmental Assessment: Watford City Bypass Route."
[16] North Dakota DOT. (2013). "Environmental Assessment: Watford City Bypass Route."
[17] North Dakota DOT. (2013). "Environmental Assessment: Watford City Bypass Route.".
[18] Gahagan, K. (2015). "Traffic accidents an unwanted consequence of the Bakken oil boom." *Al Jazeera America,* http://america.aljazeera.com/watch/shows/fault-lines/articles/2015/1/12/traffic-accidentsanunwantedconsequenceofthebakkenoilboom.html
[19] Gahagan, K. (2015). "Traffic accidents an unwanted consequence of the Bakken oil boom." *Al Jazeera America,* http://america.aljazeera.com/watch/shows/fault-lines/articles/2015/1/12/traffic-accidentsanunwantedconsequenceofthebakkenoilboom.html
[20] Calculated from North Dakota DOT. (2014). "2013 North Dakota Crash Summary," and Zacher, Wayne, "2016 Crash Rates." Message to Oana Leahu-Aluas. 6 April 2017. E-mail.

Proactive Public Involvement

The public involvement process for the bypass project started very early on, in order to secure buy-in from community stakeholders and allow them to help determine project alternatives. NDDOT and KLJ anticipated that community members' main apprehensions would be the loss of business and visitors to town, as well as their concern that their personal land would be bisected as part of the project. At the first of two public involvement meetings, KLJ presented attendees with a map of the overall project area and provided them with markers so the town residents could make suggestions regarding which alignment the bypass could take without impacting important resources. In addition to the public meetings, NDDOT hosted a project website with maps and updates. The NDDOT Communications Division utilized a public involvement committee (PIC) to conduct outreach about all widening and bypass projects in western North Dakota, including the Watford City bypass. The PIC kept the community informed through television interviews, ground-breaking and ribbon-cutting events, press releases, meetings with community groups, and participation in conferences.

Having input from the landowners proved indispensable. For example, one landowner invited KLJ personnel to drive the corridor with him, which they agreed to. Personal engagement such as this allowed KLJ to learn of potential challenges early on, and then strategize on how to resolve them or route the bypass in such a way as to avoid them. Using the information provided by the community members, in combination with concurrent environmental studies, NDDOT narrowed the options down to a few routes. Input from the Watford City officials, along with public feedback, ultimately lead to the selection of a preferred alternative. The strategies NDDOT utilized to engage with local stakeholders throughout the bypass project showcase the ways in which DOTs can work to achieve buy-in early and ensure that local stakeholders feel a sense of ownership and see the value of the project.

CSS Core Principle #3: The strategies NDDOT used to engage the public throughout the Watford City bypass project life cycle demonstrated a commitment to continued communication and true collaboration.

Interagency Coordination

NDDOT coordinates with resource agencies and the U.S. Army Corps of Engineers (USACE) through Interagency Coordination Meetings (ICM). These regular meetings have built strong relationships and trust between agencies, as well as a collective understanding of the types of concerns to be expected and the solutions likely to receive approval. Throughout the bypass project, NDDOT had a long-standing item on the monthly ICM agenda to provide updates on the National Environmental Policy Act (NEPA) process, design, permitting, and commitment compliance during construction. This protocol kept the ICM participants informed about the

INTERAGENCY COORDINATION MEETINGS (ICM)

The objective of the ICM is to provide a forum that enhances cooperation, coordination, and dialogue between federal and State agencies, tribes, and other stakeholders relevant to the administration of USACE Section 10/404 regulatory program. The official ICM roster of agencies is shown below.

Federal Agencies:

- Federal Highway Administration
- U.S. Bureau of Reclamation
- U.S. Fish and Wildlife Service
- Natural Resources Conservation Service
- U.S. Forest Service
- U.S. Environmental Protection Agency
- Federal Aviation Administration
- National Park Service
- USACE Garrison Project Office
- USACE Oahe Project Office
- USACE Regulatory Office

State Agencies:

- NDDOT
- North Dakota State Water Commission
- North Dakota State Historic Preservation Office
- North Dakota Department of Health
- North Dakota Game and Fish

NORTH DAKOTA INTERAGENCY REVIEW TEAM (NDIRT)

The primary role of NDIRT is to facilitate the establishment of wetland mitigation banks by ensuring the availability of reliable information to assist bank sponsors in making informed decisions. NDIRT is also responsible for approving and activating mitigation banks designed to offset impacts to non-jurisdictional wetlands.

NDIRT is composed of the following agencies:

- North Dakota Game and Fish
- Natural Resources Conservation Service
- Federal Highway Administration
- USACE
- U.S. Environmental Protection Agency
- U.S. Fish and Wildlife Service

current status and development of the project, created opportunities to discuss how to avoid and minimize impacts with alternative development, and resolved any issues or concerns that arose during construction.

To expedite the environmental approvals for the Watford City bypass project, and to ensure timely decisions for the fast-moving project, hourly project team meetings took place every other week, with some ICM members in attendance. During the meetings, agency representatives convened in person or via phone conference while sharing screens, and addressed document edits and comments in real time, ensuring that nothing was lost in translation and allowing for rapid document review. The preferred project alternative ultimately resulted in jurisdictional wetlands impacts, which were mitigated using sunken box culverts and riprap. The Foss Wetland Bank was used for mitigating the natural/non-jurisdictional wetlands. These strategies emerged as informal policies based on agreements developed through the ICM and another agency group, the North Dakota Interagency Review Team (NDIRT).

Foss Wetland Bank. *Source: Cory Lawson*

CSS Core Principle #1: NDDOT's close collaboration with partner agencies exemplifies the department's efforts to establish a shared stakeholder vision as the basis for decisions. The real-time feedback loops facilitated through the ICM and NDIRT enable NDDOT to gauge the feasibility of plans or ideas before investing too much time and effort in them.

NDDOT holds annual multi-day field trips with NDIRT to review and gather feedback on completed construction projects. This process serves as a valuable accountability tool for NDDOT. Cory Lawson, Environmental Services Section Leader for NDDOT, explained that the field trips provide an opportunity to reflect on lessons learned, that ultimately make NDDOT better. The collaboration approaches through the ICM and NDIRT demonstrate a commitment to efficiency, project streamlining, and enhan ced iterations over time, all examples of CSS principles being put into practice.

During the Watford City bypass project, the high demand for land created a situation of rapid and continuous change. Permits for oil and gas development were being issued extremely quickly. NDDOT brought on the Oil and Gas Division of the North Dakota Industrial Commission's Department of Mineral Resources as an agency partner, to keep them in the loop about any developments with the potential to affect the project.

Expediting Decision-Making Through Efficient Communication and Collaboration

In addition to the systems in place to facilitate collaboration with other agencies, NDDOT employed other practices that served to expedite the decision-making and project delivery processes. For instance, NDDOT funded two full-time positions – one at USACE, and another at U.S. Fish and Wildlife Service. Mark Schrader, Transportation Engineer with the FHWA North Dakota Division, observed that when the oil boom occurred in western North Dakota, "it was valuable to have those positions. If those [hadn't] been there, it would have been way more challenging."

Furthermore, the close collaboration among NDDOT divisions ensured that everyone was on the same page, and enabled swift implementation of changes and decisions. During the Watford City bypass project, NDDOT right-of-way staff communicated any issues they came across to the project manager and designers, such as trees or fencing that could not be moved, so that these items could be incorporated into the plan notes as the plans were being finalized for construction. In addition, right-of-way staff held weekly meetings and produced periodic reports to gauge the atmosphere with landowners and discuss the trends on the ground. Right-of-way acquisition, project design, and environmental reviews were all being done concurrently.

NDDOT's cradle to grave project management strategy of having one overall project manager for the Watford City bypass, instead of having a project manager within each NDDOT division, proved to be effective in streamlining communications and accelerating the project timeline. The project manager, Wayne Zacher, regularly communicated with the consultant and other key project delivery team members and thus stayed aware of developments on all aspects of the project in real time. Zacher also ensured that any reviews that could be done concurrently were done in this manner, in order to minimize delays. All of the expediting strategies employed by NDDOT resulted in an extremely quick project timeline, with only 16 months from consultant notice to proceed for the environmental assessment to contract bids.

CSS Core Principle #3: NDDOT's project management strategies established systems for reaching consensus through continued communication and collaboration among those involved in the Watford City bypass project.

Comprehensive Engagement with Tribes

NDDOT has a unique process for engaging and coordinating with tribes on transportation projects. This process is conducted through the Tribal Consultation Committee (TCC), which meets twice each year. At these meetings, NDDOT presents its Statewide Transportation Improvement Program (STIP) and invites tribes to provide input and express concerns early on, at the project programming stage. Building relationships over time via in-person conversations ensures that the truly important topics are raised and addressed.

The Watford City bypass project was discussed at several of the TCC meetings, from project inception through construction. The main concern that was voiced was the potential for impacts on stone feature sites, which have been a topic of conversation at TCC meetings for many years. These discussions equipped NDDOT with an understanding of the cultural importance of the stone features to the oral history, cosmology, ceremony, and spirituality of tribes in the northern plains region, and enabled NDDOT to successfully preserve them.

THE TRIBAL CONSULTATION COMMITTEE (TCC)

Section 106 of the National Historic Preservation Act of 1966 (NHPA), as amended, requires federal agencies to take into account the effects of their activities and programs on historic properties. The Section 106 review process requires consultation between an agency official and other parties with an interest in potential impacts to cultural resources. The NHPA was amended in 1992, with implementing regulations published in 1998 that require consultation with tribes. The regulations allow agreements that provide tribes with additional opportunities to participate in the Section 106 process.

NDDOT and the FHWA North Dakota Division consulted with tribes in person at various reservations in North Dakota and Montana between 1998 and 2004, at which point they began working together to create what would become the Section 106 Programmatic Agreement (PA) for Tribal Consultation in North Dakota. The PA, signed in November 2006, stands out from similar agreements developed in other regions because tribal representatives took an active role in drafting the document, with full support from NDDOT and FHWA's North Dakota Division.

The PA established the TCC, which is made up of representatives from each consulting Native American tribe, NDDOT, and FHWA's North Dakota Division. At three-day meetings held twice per year, transportation projects and programs, along with cultural resource issues, are discussed. Conducting consultations together rather than individually enables the tribes to combine their expertise and effectively convey their most important concerns. The process of working together has allowed the agencies and the tribes to build the trust, respect, and personal relationships necessary to collaborate effectively.

For more information on the origins of the TCC, please refer to "In Their Own Light: A Case Study in Effective Tribal Consultation," accessible at https://www.fhwa.dot.gov/resourcecenter/teams/environment/tribal_consult.pdf.

Whereas past approaches to identifying cultural resources at a project site would have involved corridor studies, in this case NDDOT pursued a large block survey of the area. Because this was a new construction project, it was expected that several alternatives would be identified, but it was unknown exactly where, so a large block survey allowed all potential alternatives to be encompassed. This approach allowed NDDOT to collect all necessary cultural data at once, eliminating the need to spend funds on sending people to the site multiple times. And because NDDOT knew where cultural resources were located early in the planning process, it was easy to route the bypass in such a way as to avoid them.

From June 11 through November 7, 2012, an outside firm conducted a Class III Cultural Resource Inventory (intensive pedestrian survey) of 13,018 acres of land as a large block study area. Representatives of the Three Affiliated Tribes and the Turtle Mountain Chippewa – the two reservations closest to the project area – accompanied the archaeologists during the survey and contributed to the identification and interpretation of cultural resources. Since 2007, NDDOT has required the involvement of tribal Traditional Cultural Specialists (TCS) in the field with the archaeologists, so that resulting archaeological reports reflect the tribal concerns and issues without revealing confidential information. The study revealed 79 sites, 19 isolated finds, and two site leads.

CSS Core Principles #1, #3, and #4: NDDOT's deliberate and comprehensive engagement with tribes is an exemplary model of making decisions based on a shared stakeholder vision and working to achieve consensus through continuous communication and collaboration. Routing the bypass to avoid cultural sites shows that effective transportation solutions can be implemented while preserving valued aspects of the community environment.

Realizing the Shared Vision

A region's transportation system has a large impact on all aspects of quality of life, including economic health, safety, housing, land use, mobility, and public health. Construction of the Watford City bypass was a crucial improvement to the transportation system that highlights how a CSS-based approach contributed to improved quality of life for Watford City residents. By diverting truck traffic away from the city, Watford City administrators were able to focus on providing crucial infrastructure and enhanced livability for the growing population.

The traffic flow and safety improvements facilitated by the bypass complemented Watford City's development investments. During the oil boom, McKenzie County contributed about half of the tax revenue for a State fund supported by wellhead taxes. The State channeled some of these funds back to the local level, and Watford City worked out a finance package that enabled the city to leverage the funds for development projects. Watford City invested these funds into additional paved roads, housing developments, daycare centers, a high school, an event center, and a hospital. With help from the State, the city also expanded water and sewer infrastructure.

Moen described the growth and development as follows: "The oil is here. Industry is going to come get the oil. Do we want to attract those families, or not allow that and they leave, and at some point in time we're back to where we were? Small communities are dying. Small farms are disappearing. Something like this comes along, you have opportunity to entrench yourself."

Yet even as the initial frenzy of the oil boom has faded, the changes in Watford City have laid the groundwork for a stable and prosperous community. Population levels have begun to stabilize, and are comprised increasingly of families rather than single oil workers. The percentage of traffic composed of trucks has declined, and the percentage comprising passenger vehicles has increased.

Temporary trailer parks and man-camps set up during the influx of oil workers.
Source: www.intersectionjournal.com

New housing developments in Watford City.
Source: Oana Leahu-Aluas

Watford City High School. *Source: Obernel.com*

An architect's rendering of Fox Hills Village. *Source: Minotdailynews.com*

Rough Rider Center. *Source: MckenzieCounty.net*

As the price of oil has declined in recent years, "there was no decrease in [Watford City school] enrollment," per McKenzie County Superintendent Steve Holen. An independent demographics study estimates that future enrollment will continue increasing steadily, with total enrollment projected to exceed 3,000 in 2025.[21] Using school enrollment as a proxy for population, Watford City's population is poised to continue growing despite downturns in oil development.

Adjacent to the new high school is the new event center, dubbed the Rough Rider Center, which houses two hockey rinks, a swimming pool, a gymnastics room and an indoor field house for soccer, baseball, and other sports. It can also serve as a venue for concerts, conventions, and business meetings, with meeting space available for up to 1,000 people.[22] Across the street is Fox Hills Village, a "bustling" development of commercial, multi-family, and residential property. [23]

Despite initial fears that the bypass would negatively impact business in Watford City, five new businesses moved into the main street corridor in early 2016. McKenzie County Economic Development director Gene Veeder told the McKenzie County Farmer, "A vital Main Street in Watford City has been a priority of community development for many years, and we are excited to fill the spaces with interesting and unique businesses that add to the public experience in town."[24]

Moen sees the bypass as a key piece of the puzzle that has enabled Watford City to grow and develop so rapidly. In contrast with earlier generations that left the small town, Moen anticipates the schools and other amenities now offered in Watford City will encourage young people to stay and build a life in the area. Moen explains, "now with the bypass, the semis don't come to town anymore. You don't have to deal with it. It's cleaner. The noise isn't there." Watford City Engineer Rick Jore echoed this sentiment, indicating that things were "chaotic" prior to the bypass, and that the bypass "improved the efficiency for everything going on around us."

[21] (2016). "Watford City sustains growth despite downturn." *EagleFordTexas.com,* http://eaglefordtexas.com/news/id/164021/watford-city-sustains-growth/
[22] (2016). "Watford City sustains growth despite downturn." *EagleFordTexas.com,* http://eaglefordtexas.com/news/id/164021/watford-city-sustains-growth/
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America's Transportation Award for the Watford City bypass. Source: Oana Leahu-Aluas

National Recognition

In 2015, the Watford City bypass was recognized as a winner in the annual America's Transportation Awards administered by the American Association of State Highway and Transportation Officials, U.S. Chamber of Commerce, and American Automobile Association. The project won in the Quality of Life/Community Development category under the "Medium Project" designation and was named one of the Top 10 projects in the overall competition.

Effective CSS Practices: Key Takeaways

This case study presents several CSS practices that NDDOT used to deliver a successful transportation project while optimizing agency resources. The practices are engrained in the NDDOT culture and project life cycle. Other DOTs can replicate and adopt similar practices to take advantage of the benefits of CSS.

The Watford City bypass project showcases the following strategies, which reflect the CSS approach and core principles discussed earlier in this case study.

- Close collaboration with environmental resource agencies;
- Partnership with Native American tribes;
- Flexibility in design of the bypass;
- Proactive public engagement; and
- Real-time environmental review process

Together, these strategies resulted in the following benefits:

- Accelerated project development and delivery;
- Streamlined project management;
- Improved quality of life for Watford City residents;
- Increased community buy-in; and
- Improved capacity and mobility within the Watford City region

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