

City of Bismarck

Engineering Department Overview

The Engineering Department provides municipal engineering service and support to other Departments, the City of Bismarck, its citizenry and customers. The principal responsibility of the Engineering Department is to provide the technical advice required to masterplan, design and observe construction of municipal improvements, municipal facilities and utility systems.

The Department also provides traffic engineering services, construction surveying, review and approval of site plans and issuance of excavation, concrete and transporting permits. The Department also works with consulting engineers and developers in the process of land development, which includes the planning, plan development, construction and installation of water, sewer, storm sewer and streets.

Project Types Completed By Engineering Dept.

Crack Seal



Pavement cracking is an inevitable occurrence that requires routine proactive maintenance strategies to mitigate and extend the pavements service life. Cracking requires treatment to prevent moisture from getting underneath the roadway and accelerating pavement deterioration. Neglecting cracks results in significant problems such as potholes and pavement failure, which will cost more to maintain and repair. Crack filling and sealing is one of the main preventative maintenance practices for pavements. Since failure to

repair/treat cracks in a timely fashion can lead to accelerated deterioration, it is important to find effective solutions to minimize its effect and extend the service life of our roads. This work is completed by the Public Works Street Department as annual maintenance throughout the City.

Full Depth Repair



Full depth repairs are performed when the pavement has failed in localized areas to an extent that the underlying support materials have disintegrated or otherwise lost their load carrying capacity. Full depth repairs require the removal and replacement of much, if not all, of the underlying base and sub-base materials. Due to the thorough nature of this method of repair it has sometimes been referred to as "spot reconstruction." This work is completed on Street Improvement Districts and in areas of the city that are not in a district by the Public Works Street Department.

Concrete Pavement Repair



Concrete pavement repairs are performed when the pavement has failed in localized areas to an extent that the underlying support materials have disintegrated or otherwise lost their load carrying capacity. Full depth repairs require the removal and replacement of much, if not all, of the underlying base and sub-base materials. Due to the thorough nature of this method of repair it has sometimes been referred to as “spot reconstruction.” This work is completed through a Street Improvement District.

Pavement Mill & Overlay

Pavement overlay is used to extend the life of the pavement before it reaches the end of its service life. To perform a pavement overlay, crews mill, or remove, a 2”-3” layer of asphalt from the surface of the roadway. Full depth repairs are performed in any spots on the roadway where there are underlying weaknesses that would cause a newly paved road to deteriorate prematurely. A new layer of asphalt is applied and compacted with a roller, and new lines are painted on the roadway, where required. Overlay operations begin in May and continue through October, weather permitting.

Pavement Reconstruction



When a road is significantly deteriorated and will not benefit from routine preventative maintenance, the road needs to be reconstructed. This entails removing the entire layer of pavement and recompacting the subgrade below the pavement and rebuilding the road from the subgrade up, essentially creating a new road. City Engineering manages pavement reconstruction through its Capital Improvement Projects program funded by sales tax and special assessments.

Chip Seal & Scrub Seal



Chip Seal is a surfacing treatment that places a thin layer of asphalt emulsion, followed immediately by the application of rock chips over new pavement surfaces.

A scrub seal is applied as a preventive maintenance to roads that have moderate pavement defects. A scrub Seal provides a coarse wearing surface with increased tire traction, improving safety during winter driving conditions and helping to protect and lengthen the life of the asphalt driving surface. It is considered a preventative treatment that helps to keep the “good roads good.”

Watermain, Sanitary Sewer or Storm Sewer Replacement or Rehabilitation



When flow rates begin to reduce within an area of the City or valves and hydrants no longer function properly it is necessary to remove and replace these infrastructure items to provide improved service to the City. Watermain replacement occurs in two methods; as stated above when completing a full pavement reconstruction of the street is required or by cutting a 12-foot to 14-foot section of the roadway and removing it above the pipe location. The soil is then removed to the pipe and the pipe and any valves or hydrants removed. The soil is then graded and new sand bedding is installed and the new pipe is installed.

Additional sand bedding is placed on top of the pipe to the required depth above and then the trench is filled in compacted layers of soil and the asphalt road surface is placed completing the work. This technique of infrastructure replacement is also utilized for sanitary sewer and storm sewer. In addition, the City also has completed lining of water, sewer and storm lines and manholes as a rehabilitation and preventive maintenance measure. This technique does not require the full excavation, removal and replacement of the line and is much less evasive.

Sidewalk Maintenance and New sidewalk



The City will choose a section of the city to investigate and citizen concerns for the need for sidewalk repairs each year. The repairs can be required to fix trip hazards, delaminated surfaces, severely cracked sidewalk or crack separated sidewalk that provide hazards to the pedestrian. If the engineering department is called to a specific address due to a hazard we will investigate the entire block on both sides of the street to see if any other hazards exist and mark those for repair as well. The hazards are marked to the nearest joint, the panel is broken and removed and a new panel(s) is poured. This work is completed under a city-wide contract and assessed to the property owner. The work may also be paid in full by the property owner, by their choice, upon completion or prior to the assessment. The property owner may hire an approved, licensed and bonded concrete contractor to complete the work and pay them directly. Non-compliant and hazard ADA ramps are identified and repaired under street improvement districts.



New sidewalk is completed within new subdivisions upon completion of the home and driveway. The new sidewalk is completed through the city-wide concrete contract and can be special assessed or the homeowner can choose to pay for it upon completion or prior to the assessment.



Street Lighting



The City will create an improvement district for residential & commercial street lighting when 50% of the lots that were annexed into the city in any given area are occupied. This typically occurs within a year or two after the streets have been completed. The improvement district will include multiple sections of town to help reduce the overall cost of the project. Each unit is assessed to the benefitting properties within that unit and assessed among the number of properties within that unit. Street light maintenance and repair is funded by Public Works with design, bidding and construction observation completed by the Engineering department. The costs of maintenance and repair is funded by the street light utility fund included in the water bill.

Signing and Traffic Signals



The City installs traffic control devices, stop signs, yield signs & traffic signals, at intersections when they are warranted by the Manual for Uniform Traffic Control Devices (MUTCD). The City also installs regulatory signs based on criteria established in the city ordinances and by the Police Department. Street signs are installed when new streets are added to the City. Street signs will be replaced when there is a street improvement district project completed on a street. Street signs are replaced about every 12-15 years or as needed due to deterioration of reflectivity.



Traffic signals are installed when the criteria is met to warrant the installation of a signal by the MUTCD. There are nine traffic signal warrants for the installation of a traffic signal, of these nine warrants at least one must be met and an engineering study is completed that indicates it will improve the overall safety and/or operation of the intersection and does not seriously disrupt progressive traffic flow to warrant the installation of a traffic signal.