Annual Report for Year 1 (2022-2023) of the Time Limited Water Quality Standard for Chloride

June 20, 2023

Prepared by City of Palos Heights

Chicago Area Waterways
CHLORIDE WORKGROUP

LOWER DES PLAINES WATERSHED GROUP

City of Palos Heights is a member of the Chicago Area Waterways Chloride Workgroup

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1.0 Introduction to Chloride Issue in CAWS/LDPR

This Pollutant Minimization Plan (PMP) has been prepared by the City of Palos Heights to reduce the environmental impacts from the organization's chloride related operations. The City of Palos Heights is a discharger covered under the Time Limited Water Quality Standard for Chloride for the Chicago Area Waterways System and Lower Des Plaines River watersheds. This PMP has been prepared to meet the requirements laid out in the Time Limited Water Quality Standard (TLWQS) for Chloride. The term of this PMP covers the first 5-years of the TLWQS period and will be updated following the re-evaluations at Years 4 ½, 9 ½, and 14 ½.

Chloride is a permanent pollutant. It does not degrade over time and continues to accumulate in the environment. Proactive measures to reduce the amount of chloride discharged can help reduce the impacts from chloride on receiving waterways and the environment. Chloride impacts aquatic life, vegetation, and infrastructure. As the chloride concentrations increase and our waters become saltier, aquatic and plant biodiversity decreases and native species are overtaken by salt tolerant invasive species.

Chlorides are commonly found in road salt, fertilizers, water softeners, dust suppressants, and certain industrial processes. Chloride-based deicers, like rock salt, are used on parking lots, sidewalks, and roads to provide safe surfaces to the public during the winter months. These deicers are one of most common sources of chloride in the Chicago region.

The water quality standard for chloride for the Chicago Area Waterway System (CAWS) was updated as part of the rulemaking process related to changing the designated use of the CAWS. The chloride standard was updated from 1,500 mg/L during the winter and 500 mg/L during the summer to 500 mg/L all year round. The change in the chloride water quality standard took effect in 2018. Because portions of the CAWS were not going to meet this new standard due to the need to maintain public safety on roads, highways, sidewalks and parking lots during the winter months, a joint submittal and supporting individual petitions were submitted between 2015 and 2018 to the Illinois Pollution Control Board for a variance from the chloride standard. The joint petition laid out best management practices that can be achieved by the petitioners to reduce their chloride use while maintaining public safety during winter storms. In addition to the CAWS, portions of the Lower Des Plaines River watershed were included as it receives water from the CAWS.

On November 4, 2021, the IPCB issued an Opinion and Order for a Time Limited Water Quality Standard (TLWQS) for Chloride for portions of the CAWS and Lower Des Plains River watersheds. The TLWQS for Chloride watersheds are defined in the Opinion and Order as the Des Plaines River watershed from the Kankakee River to the Will County Line (except for the DuPage River watershed) and the CAWS watershed (except the North Branch Chicago River watershed upstream of the North Shore Channel and those portions of the watershed located in Indiana). This is a watershed-based approach to reduce the chloride concentrations in the CAWS and Lower Des Plaines River. The TLWQS for Chloride requires all dischargers covered under the TLWQS for Chloride to create PMPs and implement specific best management practices based on their operations to reduce their chloride discharges.

2.0 Organization, Facility Information

Agency Name: City of Palos Heights		
Facility Name: Public Works		Permit Number: ILG103030
Facility Address: 7607 W College Drive		
City: Palos Heights	State: Illinois	Zip Code: 60463

The City of Palos Heights is a Municipal Separate Storm Sewer System (MS4) with two outfalls to the Cal Sag Channel. The City maintains 85 lane miles of streets and a salt storage garage with a 1,000 ton capacity.

2.1 Level of Service for Winter Maintenance Activities

Most of the local streets maintained by the City of Palos Heights are classified as low volume – low speed local roads with ADT<1000 and 20 MPH speed limit. The following Winter Maintenance Activities were developed for all local roads:

Pavement Temperature	Weather Conditions	Maintenance Actions	Salt (Tons) Prewetted/Pretreated with Brine/Other Blends	Dry Salt
>30°F ↑	Snow	Plow, Treat Intersections Only	80 (40/lane mile)	100
	Frz. Rain	Apply Chemical	80-160	100-200
30°F↓	Snow	Plow & Apply Chemical	80-160	100-200
	Frz. Rain	Apply Chemical	150-200	180-240
25°F - 30°F ↑	Snow	Plow & Apply Chemical	120-160	150-200
	Frz. Rain	Apply Chemical	150-200	180-240
25°F - 30°F ↓	Snow	Plow & Apply Chemical	120-160	150-200
	Frz. Rain	Apply Chemical	160-240	200-300
20°F - 25°F ↑	Snow	Plow & Apply Chemical	160-240	200-300
	Frz. Rain	Apply Chemical	160-240	200-300
20°F - 25°F ↓	Snow	Plow & Apply Chemical	200-280	250-350
	Frz. Rain	Apply Chemical	240-230	300-400
15°F - 20°F ↑	Snow	Plow & Apply Chemical	200-280	250-350
	Frz. Rain	Apply Chemical	240-320	300-400

	Snow	Plow & Apply Chemical	240-320	300-400
15°F - 20°F ↓	Frz. Rain	Apply Chemical	240-320	300-400
0°F - 15°F ↑↓	Snow	Plow & Apply Chemical Blends	300-400	Not Used
			300-400	Not Used
<0°F	Snow	Plow & Apply Chemical Blends	400-600	Not Used
			400-600	Not Used

3.0 Best Management Practices

Details regarding City of Palos Heights implementation of the best management practices (BMPs) identified as part of the TLWQS for Chloride are included below.

Workgroup BMP

BMP	Agency Description of Current Implementation or Status Update to the Plan to Implement the BMP
The permittee must participate in a Chlorides workgroup for the CAWS or LDPR, depending on the watershed within which the facility's discharge is located.	City of Palos Heights has been a member of the Chicago Area Waterways Chloride Workgroup since 2022. The Director of Public Works or the Public Works Foreman routinely attend workgroup meetings and participate in workgroup training.

Salt Storage and Handling BMPs

BMP	Agency Description of Current Implementation or Status Update to the Plan to Implement the BMP
Store all salt on an impermeable pad that must be constructed to ensure that minimal stormwater is coming into contact with salt unless the salt is stored in a container that ensures stormwater does not come into contact with the salt.	All salt stored by the City of Palos Heights is stored in a building with a concrete floor to prevent contact with stormwater.
Cover salt piles at all times except when in active use, unless stored indoors.	All salt is stored in a covered building.
For working areas, provide berms and or sufficient slope to allow snow melt and stormwater to drain away from the area. If snow melt and stormwater cannot be drained away from the working area,	Work area is located directly in front of the salt storage facility. All drains are covered with a leak tight solid cover during operations. The area is swept within hours after salt operations are stopped.

channeling water to a collection point such as a sump, holding tank or lined basin for collection, discharge at a later time, use for prewetting, and use for make-up water for brine must be considered.	
MS4/CSO Only - Use deicing material storage structures for all communities covered under General Permit ILR40 for MS4 communities.	
Good housekeeping practices must be implemented at the site, including: • cleanup of salt at the end of each day or conclusion of a storm event; • tarping of trucks for transportation of bulk chloride; • maintaining the pad and equipment; • good practices during loading and unloading; • cleanup of loading and spreading equipment after each snow/ice event; • a written inspection program for storage facility, structures and work area; • removing surplus materials from the site when winter activity finished where applicable; • annual inspection and repairs completed when practical; • evaluate the opportunity to reduce or reuse the wash water.	• During salt loading and unloading operations, all storm manholes are covered with solid lids. • All trucks are stored inside the Public Works garage when not in operation. • All trucks are washed inside the public works garage with washwater collected in a triple basin. Triple basin was emptied by recycling vendor. City is investigating other ways to collect wash water. • All equipment was inspected after each storm event for damages and logged into the City's Asset Management Software. • Salt Storage Facility was inspected in May 2023 with repairs to door operator noted and repaired.

Winter Maintenance Operations BMPs

BMP	Agency Description of Current Implementation or Status Update to the Plan to Implement the BMP
Calibrate all salt spreading equipment at least annually before November 30th. Records of the calibration results must be maintained for each piece of spreading equipment.	All equipment was calibrated after Thanksgiving when holiday decorations are completed. Calibration sheets are available upon request.
Pre-wet road salt before use, either by applying liquids to the salt stockpile, or by applying liquids by way of the spreading equipment as the salt is deposited on the road.	All road salt trucks are equipped with an on-board pre-wet system.
Use equipment to measure the pavement temperature unless such equipment has already been installed on road salt spreading vehicles.	Due to the size of the City (4 square miles), pavement temperatures are measured hourly by a hand held device and applications rates are dictated by a Public Works Foreman
Develop and implement a protocol to vary the salt application rate based on pavement temperature, existing weather conditions, and forecasted weather conditions.	Application rates were developed and included in the level of service description.
Track and record salt quantity used and storm conditions from each call-out.	Salt and chemical usage was tracked by each operator and summarized after each snow event.
Develop a written plan for implementation of anti-icing, with milestones. The plan should consider increased use of liquids (e.g., carbohydrate products) beginning with critical locations such as bridges over streams.	The City does not maintain any bridges, large hills, or other critical areas where icing is routinely an issue. City uses mechanical means to maintain all roadways with good success and only applies minimal pre-wetted salt after plowing operations. City invested in articulating cutting plow blades to better remove compacted snow. City evaluated the use of anti-icing and determined that the low ADT minimizes any compacted snow on roadways and additional anti-icing agents did not provide better results.
Provide employees involved in winter maintenance operations with annual training before November 30th on best management practices in the use of road salt in operations, including the practice of plowing first and applying salt only after snow has been cleared.	All employees attend annual winter operations training and a training roster is maintained.

Be responsible for complying with all applicable BMPs even when deicing practices are contracted out and ensure that contractors are property trained and comply with all applicable BMPs.	All winter operations are completed with City Staff.
Complete an annual report, as required by paragraph 3(B) of this order, which is standardized in an electronic format and submitted to the IEPA's website and to the watershed group.	2022-2023 annual report is provided to the IEPA at the end of snow season.
Obtain and put into place equipment necessary to implement all salt spreading/deicing measure specified in this BMP, such as any new or retrofitted salt spreading equipment necessary to allow for pre- wetting and proper rates of application.	Road salt trucks are equipped with an on-board pre-wet system.
MS4/CSO/IDOT/TOLLWAY Only - Install equipment to measure the pavement temperature on the winter maintenance fleet for a sufficient number of vehicles to provide sufficient information to adjust application rates for the most efficient levels. Develop and complete a plan to equip the winter maintenance fleet before the first re-evaluation.	Due to the size of the City (4 square miles), pavement temperatures are measured hourly by a hand held device and applications rates are dictated by a Public Works Foreman
MS4/CSO/IDOT/TOLLWAY Only - Before the first re-evaluation, develop a method for conducting a post-winter review to identify areas of success and areas in need of improvement. Items to be completed as part of the review must include, but are not limited to, an evaluation of each salt spreader's application rate, variations in application rates, and discussion of the variation compared to the recommended rates. Once	

developed, the review should occur annually in the spring/early summer following each winter season.	

Additional BMPs Identified for Agency/Facility

BMP	Agency Description of Current Implementation
Brine/Chemical Blend Storage Containment	The City constructed a concrete containment wall for all brine/chemical blend liquids
Truck Scales	City purchased and maintains truck scales to measure the amount of salt that used on each route with a loader scale as a back-up.
Liquid tanks	City calibrated pre-wet chemical tanks to determine the amount of liquid chemical that is used.

3.1 Analysis of BMPs Implemented

1. Salt Storage Building – Salt Storage building is fully enclosed with proper ventilation and the site is sloped away from the building. Area around the storage facility is plowed only and does not receive any treatment. After all trucks are loaded with salt the loading area is broom swept to minimize residual salt around the facility. All employees are trained and supervised during operation. Salt Storage building is showing early signs of corrosion and this needs to be addressed within the next three years.
2. Anti-Icing – Different members of City Staff evaluated the use liquid anti-icing methods at different municipalities. City Staff also evaluated the Level of Service in neighboring municipalities after snow operations were completed. The City does not maintain any bridges, large hills, or other critical areas where icing is routinely an issue. City uses mechanical means to maintain all roadways with good success and only applies minimal pre-wetted salt after plowing operations are finished. City invested in articulating cutting plow blades to better remove compacted snow. City evaluated the use of anti-icing at our municipality and determined that the low ADT minimizes any compacted snow on roadways and additional anti-icing agents did not provide better results.
3. Measurement of Salt – City invested in several scales to determine the weight of trucks before and after snow operations. All operators report the weight of their trucks to the foremen who calculate how much salt was used.
4. Calibration – Several staff members are trained to calibrate salt trucks.

3.2 Analysis of Alternative Treatments or New Technology

City uses mechanical means to maintain all roadways with good success and only applies minimal pre-wetted salt after plowing operations are finished. City invested in articulating cutting plow blades to better remove compacted snow.

4.0 Deicing/Anti-Icing Agents Used

Materials used by Palos Heights for the 2022-2023 winter season are included as Appendix 1.

4.1 Application Rates

The application rates used by City of Palos Heights for the 2022-2023 winter season are included as Appendix 2.

4.1.1 Application Rate Analysis

Application rates noted Appendix 2 were reviewed after each storm. Most storms required the lowest setting on the auger on all 6 salt trucks. The City is using an organic compound with great success during low temperatures. City was able to activate rock salt at temperatures below zero degrees on December 22, 2022 with good success. Results were communicated to the crew the following Thursday Tailgate Talk.

4.2 Application Practices

City of Palos Heights uses the following practices to apply deicing and anti-icing materials:

- Dry Rock Salt with an organic InfernalMelt by Industrial Systems Ltd. pre-wet system. Brine is not used at the City of Palos Heights

4.3 Call Outs

A total of 10.15 inches of snow was reported in the City of Palos Heights for the 2022-2023 winter. There was one freezing rain event and nine snow event(s) for the 2022-2023 winter. City of Palos Heights had 10 call outs completed during the 2022-2023 winter. A log of all call outs completed by the City of Palos Heights are included as Appendix 3.

4.4 Use of Liquids

An estimated 3,260 gallons of organic InfernalMelt by Industrial Systems Ltd. pre-wet liquid was used to activate the rock salt.

5.0 Training

City of Palos Heights completed annual training for 15 of employees out of 15 of employees who are part of the winter maintenance operations on October 5, 2022. A list of annual training topics by type of employee is included as Appendix 4.

6.0 Deicing and Snow Removal Equipment and Maintenance

The City of Palos Heights uses equipment listed in Appendix 5 during winter maintenance activities.

6.1 Description of Equipment Washing and Wash Water Collection

Truck Washing – Truck washing is done indoors and water is collected in a triple basin. City is evaluating technologies to determine how to collect the wash water. City Staff plans to attend WEFTEC in October 2023 and meet with different vendors.

7.0 Material Storage

City of Palos Heights maintains one storage area(s). Information regarding the storage area(s) is included in Appendix 6.

8.0 Capital Purchases

Identified capital purchases from City of Palos Heights PMP to implement the BMPs and reduce chlorides in our operations over the first 5-year term of the Chloride TLWQS are included as Appendix 7.

8.1 Explanation of Capital Purchases Unable to Be Made According to the Reported Plan

9.0 Environmental Monitoring Data

Chloride monitoring data is collected for the CAWS and Lower Des Plaines River watersheds per the IPCB order. The data is maintained by the workgroups. Chloride data for the CAWS is collected by MWRD for the CAWS watershed and provided to the workgroups as part of the annual reporting as required by the IPCB order. The Lower Des Plaines Watershed Group also maintains a USGS monitoring station in the Des Plaines River at Channahon, IL that collects continuous conductivity data to estimate chloride concentrations.

Chloride monitoring data reports are posted to https://www.cawswatershed.org/reports/ and https://ldpwatersheds.org/about-us/lower-des-plaines-watershed-group/our-work/chloride-tlwqs/.

9.1 Organization Specific Chloride Monitoring Data

Not Applicable

10.0 Program Evaluation

10.1 Proposed Steps for the Coming Year

City if currently working on specifying a new dump truck to be purchased next year.

City Staff plans to attend WEFTEC in October 2023 and meet with different vendors.

11.0 Workgroup Participation

City of Palos Heights has been a member of the Chicago Area Waterways Chloride Workgroup since 2022. The Director of Public Works or the Public Works Foreman routinely attend workgroup meetings and participate in workgroup training.