# THE VIRTUAL OPEN HOUSE

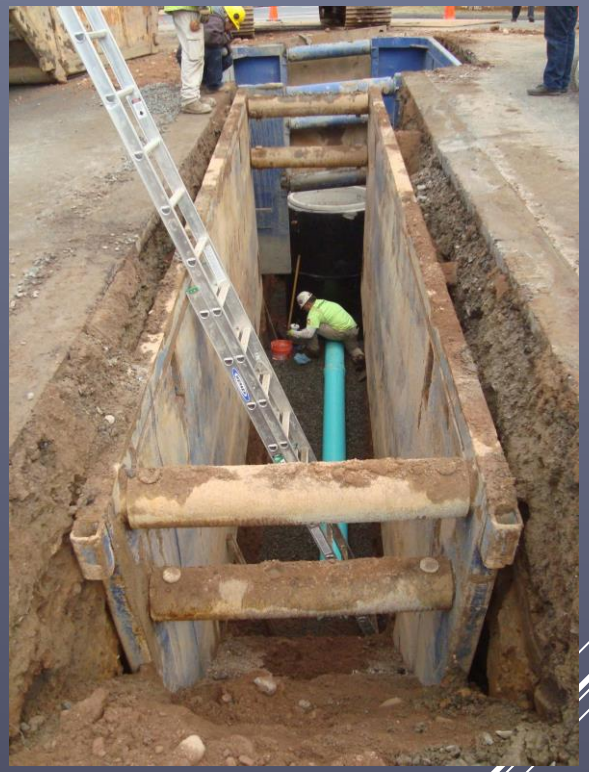
of the Canton Sewer System

# CLEAN WATER IS THE GOAL

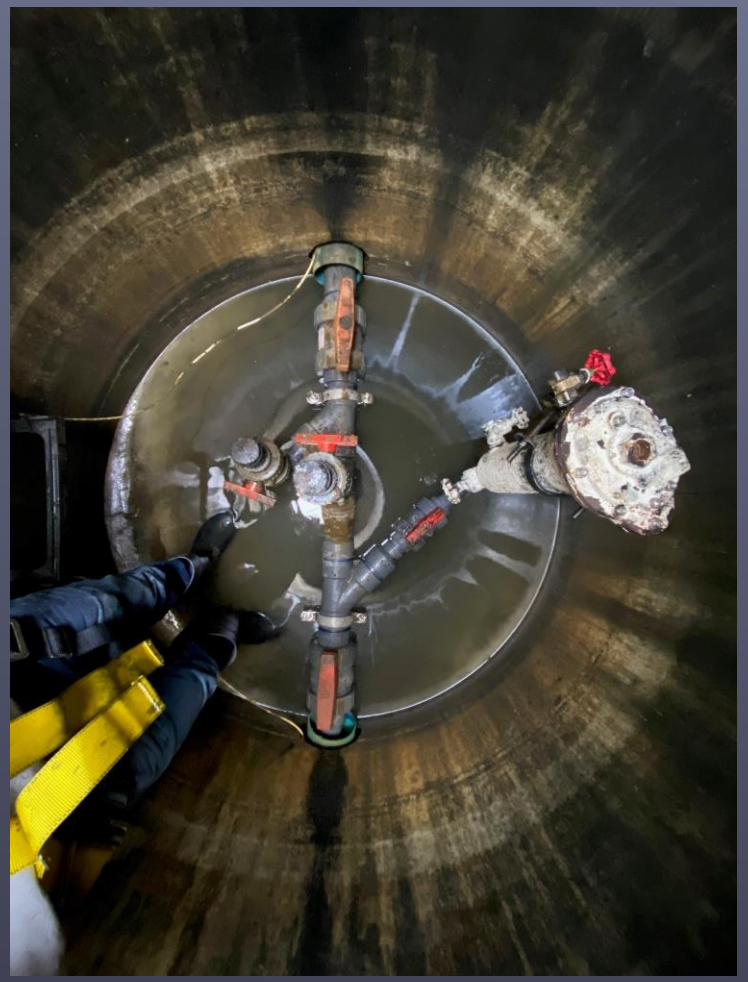
PROPER CONVEYANCE AND TREATMENT ARE VITAL BARRIERS TO THE SPREADING OF DISEASE AND ENVIRONMENTAL CONTAMINATION.


# ALL WASTEWATER STARTS AT THE SOURCE:

- RESIDENTIAL
- COMMERCIAL AND INDUSTRIAL



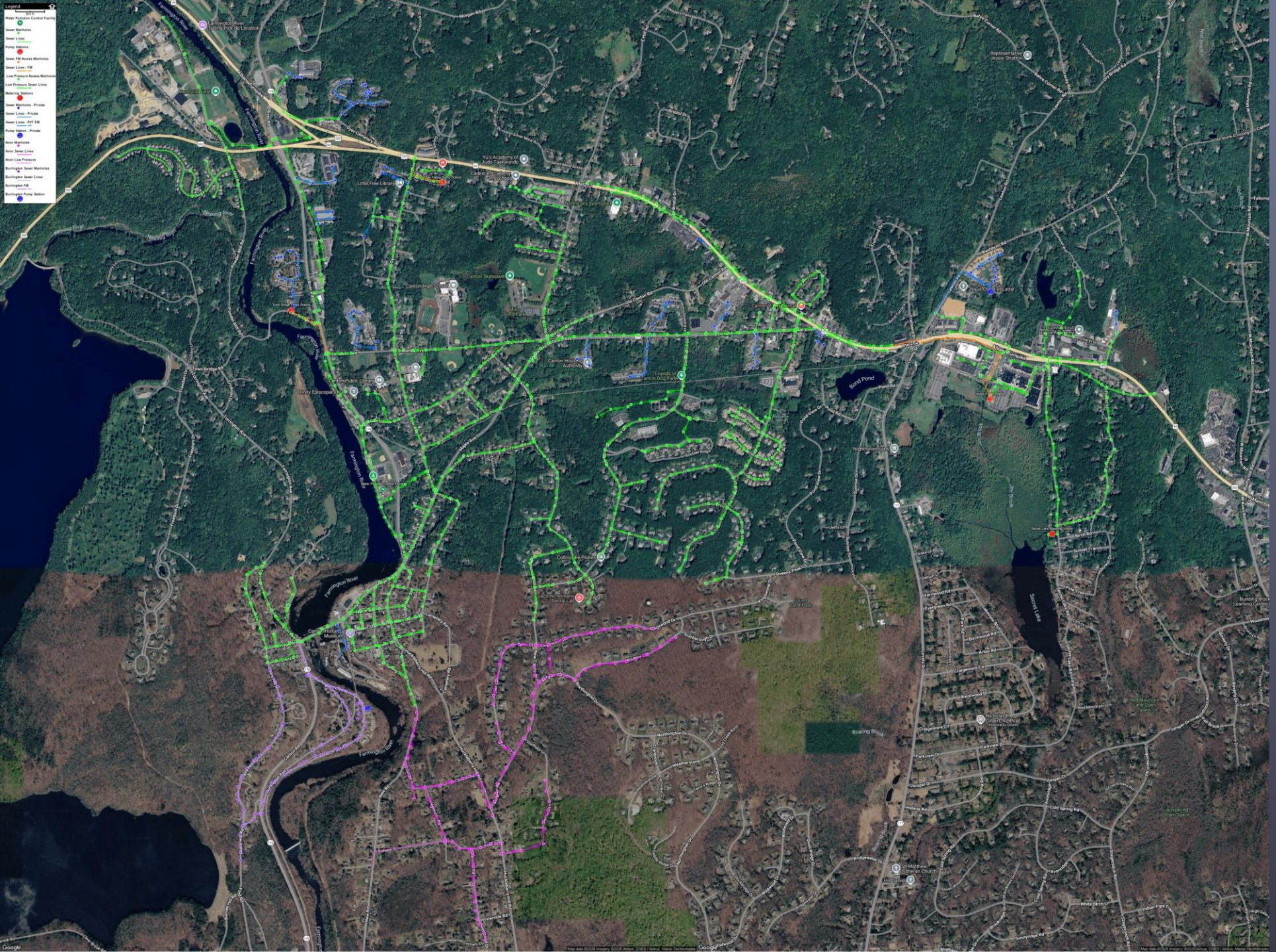
# 23.40 MILES OF GRAVITY SEWER…



# 1.95 MILES OF LOW PRESSURE SEWER…

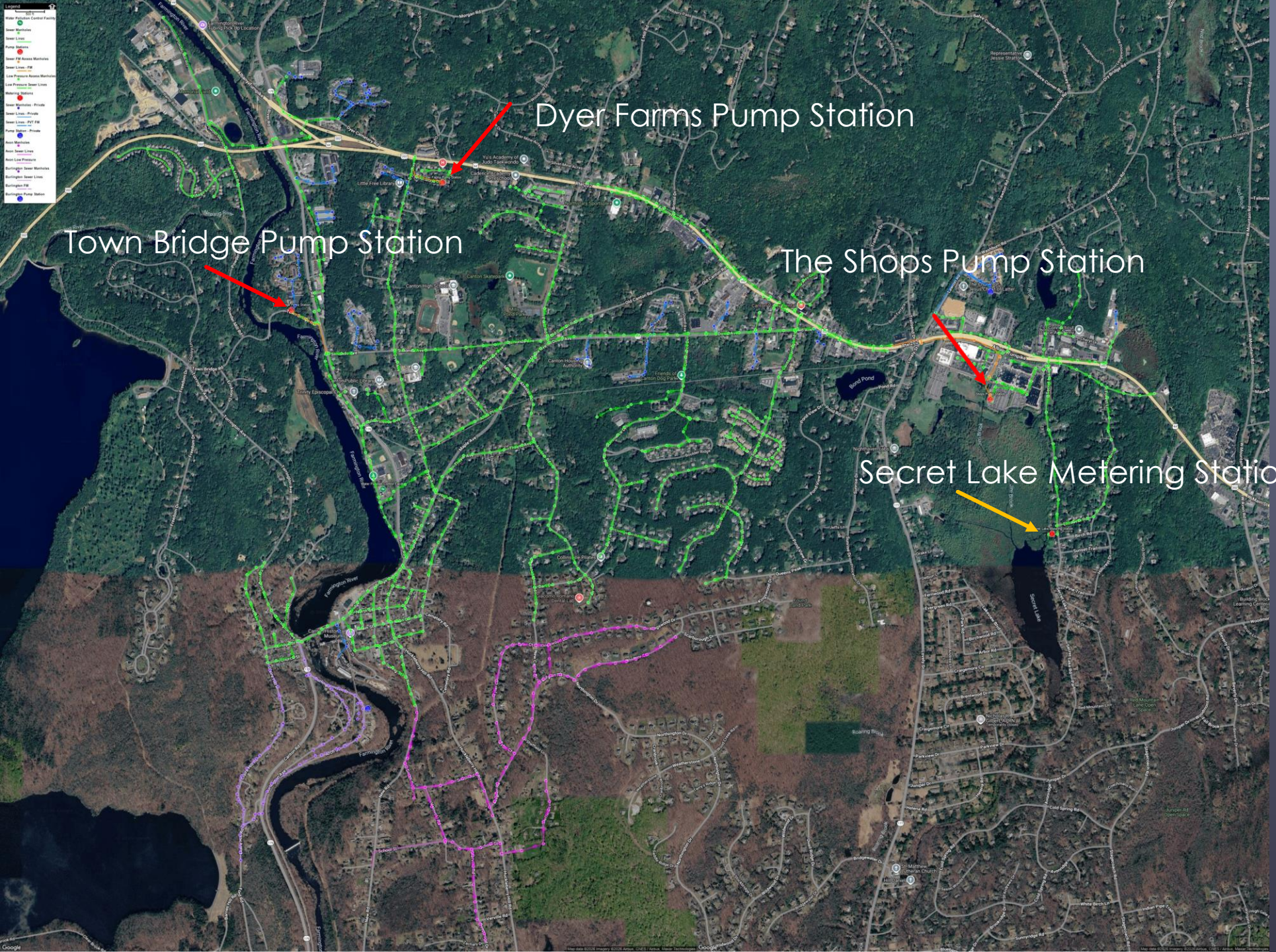
0.87 MILES OF FORCE MAIN PIPE AND 713 MANHOLES…

…FORM THE COLLECTION SYSTEM.

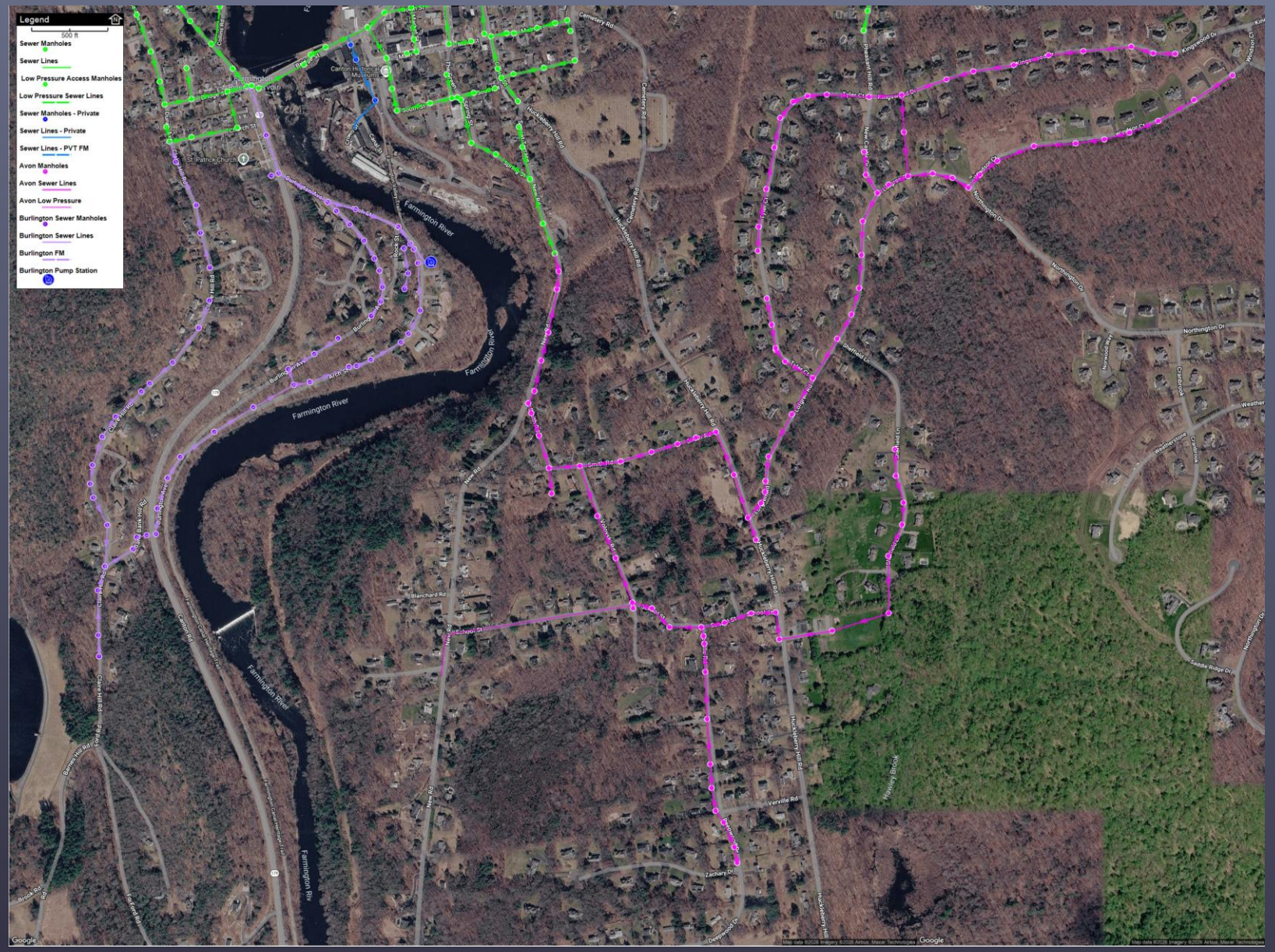



# THIS PIPING NETWORK IS WHAT CONNECTS HOMES AND BUSINESSES DIRECTLY TO THE WATER POLLUTION CONTROL FACILITY (WPCF).


# 3 PUMP STATIONS HELP MOVE IT ALONG.




# 1 METERING STATION MEASURES THE FLOW WE SEND TO THE FARMINGTON WPCF, VIA AVON SEWERS, FOR TREATMENT.




# ADDITIONAL FLOWS TO CANTON

BURLINGTON SEWERS = 2.15 MILES OF GRAVITY AND FORCE MAIN

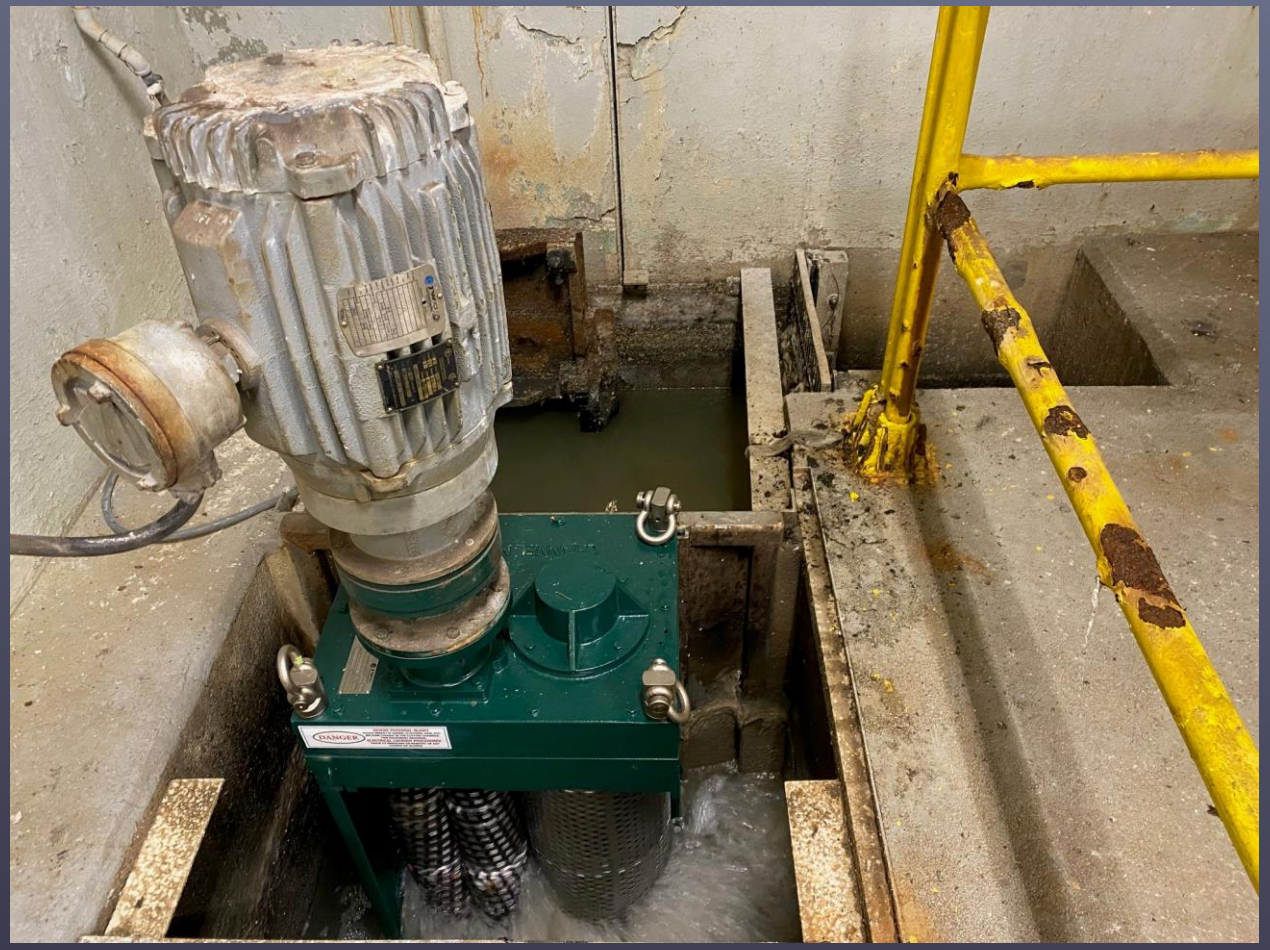
AVON SEWERS = 3.88 MILES OF GRAVITY AND LOW PRESSURE

PRIVATE DEVELOPMENT SEWERS = 3.18 MILES OF GRAVITY AND FORCE MAIN

# NOW WE BEGIN THE TOUR OF THE WPCF…

# …STARTING WITH THE LIQUID TREATMENT STREAM.

3 SEWER PIPES, CALLED INTERCEPTORS, COMBINE IN FRONT OF THE WATER POLLUTION CONTROL FACILITY. THE RAW SEWAGE, WHICH WE CALL PLANT INFLUENT, ENTERS THE INFLUENT CHANNEL.



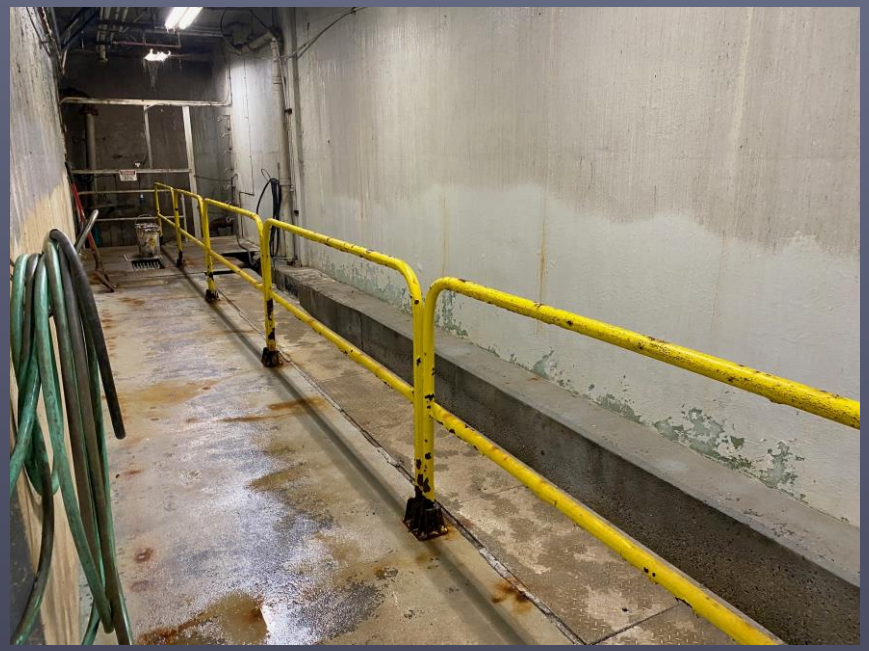
# PRELIMINARY TREATMENT

ITEMS LIKE STICKS, ROCKS, RAGS, GARBAGE, AND ROOT BALLS DON'T BELONG IN THE SEWER, BUT THEY ARE THE UNFORTUNATE REALITY.

A COMMINUTOR BREAKS, GRINDS, & SHREDS LARGE DEBRIS THAT ENTERS THE PLANT.

THIS STEP HELPS PROTECT DOWNSTREAM PUMPS, VALVES, AND EQUIPMENT FROM CLOGGING AND BINDING.

## INFLUENT CHANNEL



## INFLUENT WET WELL

AFTER COMMINUTION, WASTEWATER DROPS TO A LARGE SUMP CALLED THE INFLUENT WET WELL.

THE INFLUENT WET WELL IS 9'W X 18'L AND IS MAINTAINED AT 5' OF LIQUID DEPTH. A WALL SEPARATES THE WET SIDE FROM THE DRY SIDE, WHERE THE PUMPS ARE LOCATED.

## 4 INFLUENT PUMPS

## FLOW MEASUREMENT


CENTRIFUGAL PUMPS PULL WASTEWATER FROM THE WET WELL AND LIFT IT TO THE NEXT STAGE OF TREATMENT.

A MAGNETIC FLOW METER CAPTURES THE FLOW VOLUME BEING PUMPED. THIS VALUE IS USED FOR PROCESS CONTROL AND TO ENSURE PUMPS ARE FUNCTIONING AT THEIR DESIRED CAPACITIES.

# PRIMARY CLARIFICATION

PRIMARY CLARIFIERS SLOW THE WASTEWATER.

THIS PROCESS ALLOWS THE SOLIDS TO SETTLE.

FLOATABLES, LIKE GREASE & PLASTICS, WILL BE SKIMMED OFF.

THE SETTLED SOLIDS, CALLED PRIMARY SLUDGE, AND THE FLOATABLES, CALLED SCUM, ARE REMOVED AND HANDLED SEPARATE FROM THE LIQUID TREATMENT TRAIN.

# PRIMARY CLARIFIER FUNCTION

A MOTOR POWERED DRIVE TRANSFERS ENERGY TO A CHAIN AND SPROCKET SYSTEM.

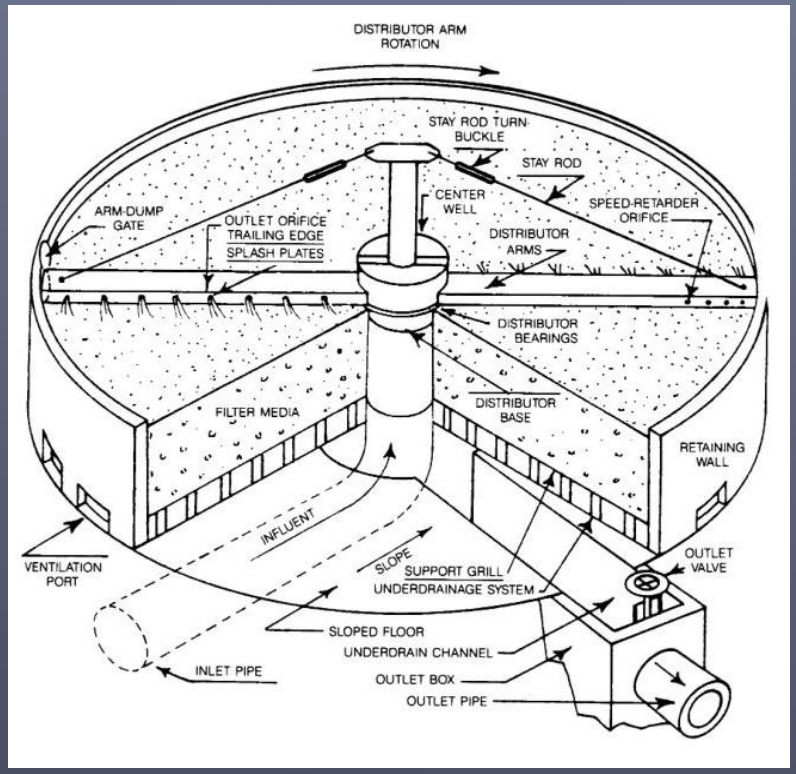
FIBERGLASS SCRAPERS, CALLED FLIGHTS, PULL SETTLED SOLIDS TO A HOPPER SO IT CAN BE PUMPED OUT.

THE FLIGHTS ALSO PUSH ANY FLOATING MATERIAL TO A MANUALLY OPERATED SCUM SKIMMER.

# SECONDARY TREATMENT

PARTIALLY CLARIFIED WASTEWATER, CALLED PRIMARY EFFLUENT, IS NOW DIRECTED TO A FIXED-FILM TREATMENT PROCESS CALLED A TRICKLING FILTER.

THE TRICKLING FILTER CONTAINS 5’ OF PLASTIC MEDIA. VOID SPACE PROVIDED BETWEEN THE MEDIA PIECES ALLOWS FOR AIR TO VENITLATE AND FOR WASTEWATER TO TRICKLE DOWNWARD THROUGH IT.




# TRICKLING FILTER TECHNOLOGY

WAS DISCOVERED IN THE LATE 1800'S. MICROORGANISMS ATTACH TO A MEDIA SURFACE AND FORM A BIOFILM. THIS POPULATION OF "BUGS" TREAT THE INCOMING POLLUTANTS BY CONSUMING THEM. THEY USING GAINED ENERGY TO REPRODUCE AND TREAT MORE POLLUTANTS. EVENTUALLY THE OLDER "BUGS" DIE OFF AND WILL SETTLE IN A DOWNSTREAM PROCESS.

## DISTRIBUTOR ARM & MEDIA

## FLOW PATTERN THROUGH INTERMEDIATE TANKS

THIS AEROBIC PROCESS DOES NOT PROVIDE THE TREATMENT LEVELS REQUIRED OF A MODERN TREATMENT PLANT, BUT IT HELPS REDUCE THE BIOCHEMICAL OXYGEN DEMAND (BOD) LOADING TO THE NEXT STAGE.

# PASSING THROUGH THE INTERMEDIATE TANKS

THE ORIGINAL TREATMENT PLANT WAS RATED FOR 0.375 MGD*. AT THAT TIME, THESE 2 TANKS SERVED AS SECONDARY CLARIFIERS.

NOW, WITH A RATING OF 0.950 MGD, THEY ARE USED AS CONDUITS BETWEEN TREATMENT PROCESSES.

UTILIZING WHAT WOULD BE UNUSED TANKAGE ALSO IMPROVES CONDITIONS THAT PROMOTE POLLUTANT REDUCTION.

*MILLION GALLONS PER DAY

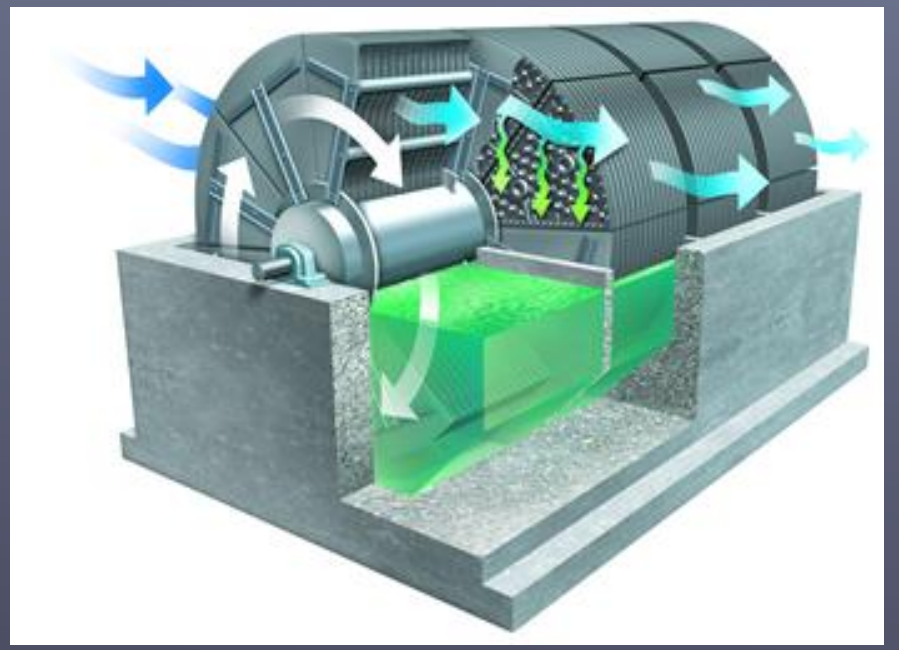
# ROTATION BIOLOGICAL CONTRACTORS

RBC's USE A SIMILAR FIXED FILM, OR ATTACHED GROWTH, PROCESS AS A TRICKLING FILTER.

WHAT DIFFERS IN THIS STEP IS THE MICROORGANISM POPULATION LIVING AND GROWING ON THE MEDIA SURFACE IS IMMERSED IN THE TREATMENT STREAM AS OPPOSED TO THE WASTEWATER BEING DISTRUBUTED OVER ITS SURFACE.

## HYBRID FIX-FILM

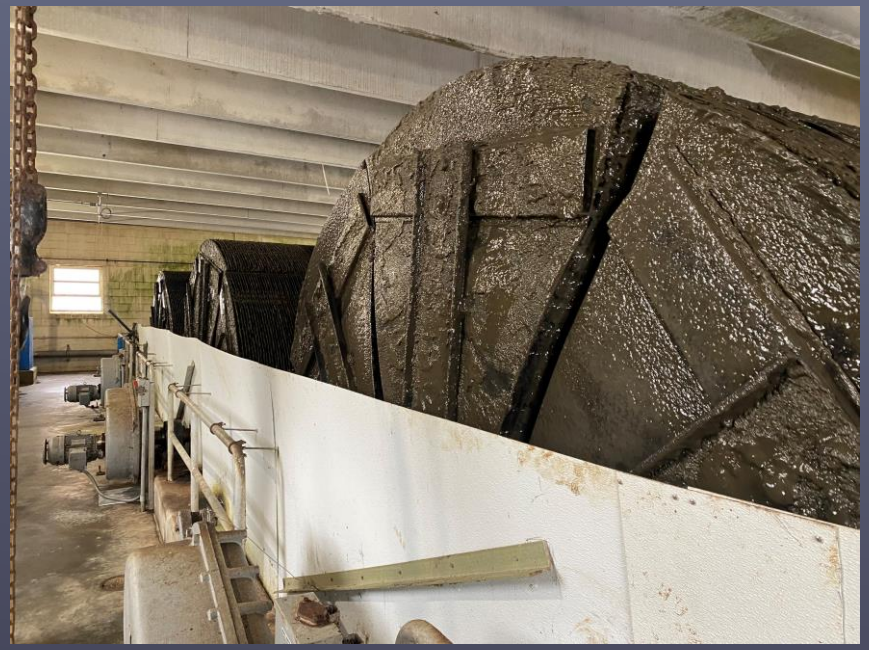
## PROCESS VISUAL



THE RBC'S ARE ROTATED IN A MIXTURE OF TRICKLING FILTER EFFLUENT AND SETTLED SOLIDS RECYCLED FROM THE NEXT PROCESS DOWNSTREAM. THIS RECIRCULATION OF SETTLED SOLIDS MAKES IT A HYBRIDIZED SYSTEM. IT WAS DEVELOPED TO INCREASE THE OVERALL QUALITY OF THE FINAL EFFLUENT.

POSITIVE DISPLACEMENT BLOWERS SUPPLY AIR TO SCOUR THE RBC'S OF EXCESSIVE GROWTH.

## HEAVY GROWTH



## AFTER AIR SCOURING

IF ALLOWED TO ACCUMLATE, AN EXCESSIVE BIOMASS LOADING ON THE MEDIA WILL AFFECT SHAFT AND BEARING LIFE AS WELL AS PROCESS PERFORMANCE.

AIR SCOURING IMPROVES/REDUCES OVERLOAD CONDITIONS.

# RBC PUMPS

FOLLOWING THE RBC TREATMENT, PUMPS LIFT THE TREATMENT STREAM, CALLED RBC EFFLUENT, TO THE NEXT STAGE, WHICH IS SECONDARY CLARIFICATION.

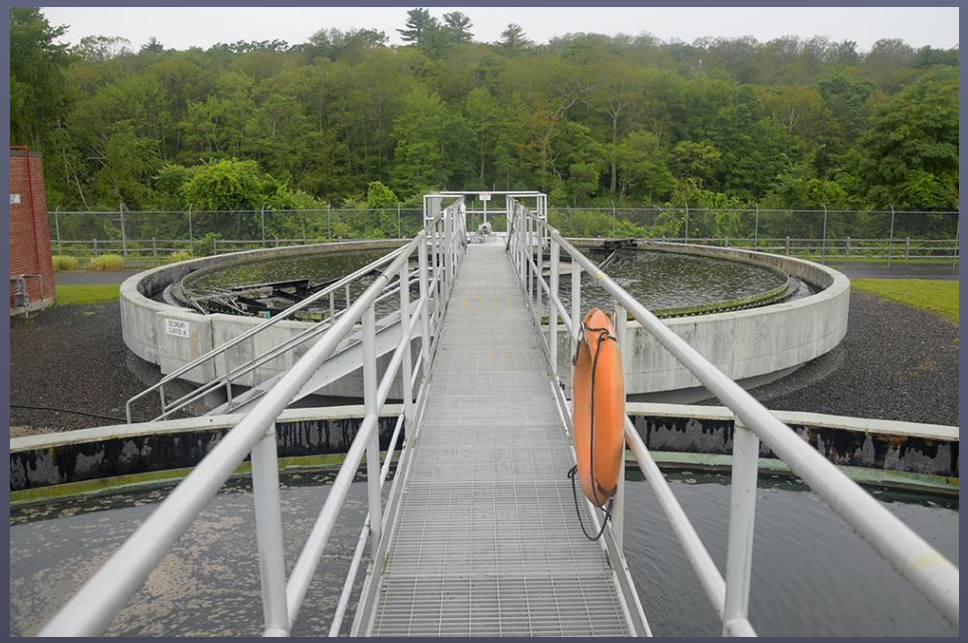
GRAVITY WILL TAKE OVER FOR THE REMAINDER OF THE LIQUID TREATMENT PROCESS.

# SECONDARY CLARIFICATION

THE PREVIOUS PROCESSES BUILT UP A MICROORGANISM POPULATION WHICH DEVELOPS SMALL PARTICLES, PROMOTES COHESION OF THOSE PARTICLES, AND ALLOWS THEM TO GROUP TOGETHER INTO CLUMPS CALLED FLOCCULATIONS, OR FLOCS.

AT THIS POINT, THE WASTE STREAM IS CAPABLE OF SEPARATING INTO SETTLEABLE SOLIDS AND A CLARIFIED LIQUID CALLED SUPERNATANT.

# CLARIFIERS IN OPERATION



# UNDER THE SURFACE…

THE SOLIDS SETTLE TO THE BOTTOM SO THEY CAN BE REMOVED; THE SUPERNATANT OVERFLOWS THE OUTER EDGE.

# SECONDARY WEIRS/BAFFLES

A BAFFLE STABILZES THE SURFACE AND PREVENTS SOLIDS WASHOUT.

A V-NOTCH WEIR PROMOTES EVEN FLOW DISTRIBUTION.

BRUSHES MOUNTED TO THE ROTATING SKIMMER/SCRAPER ARM ASSEMBLY KEEP ALGAE GROWTH UNDER CONTROL.

THE COMMON TROUGH ALONG THE PERIMETER OF EACH TANK, CALLED A LAUNDER, COLLECTS THE SECONDARY EFFLUENT.

# LEAVING SECONDARY CLARIFICATION

SECONDARY EFFLUENT FLOWS FROM THE LAUNDER TO A COLLECTOR BOX WHERE THE FLOWS COMBINE

THE WATER MOVES TO THE NEXT STAGE, TERTIARY TREATEMENT.

# TERTIARY TREATMENT

THE CLARIFIED, BUT UNFILTERED, SECONDARY EFFLUENT FLOWS THROUGH SAND FILTRATION.

TRAVELING BRIDGE SANDFILTERS ALLOW FOR CONTINOUS OPERATION; BACKWASH CYCLES ARE PERFORMED WHILE EACH UNIT IS ONLINE AND FILTERING.

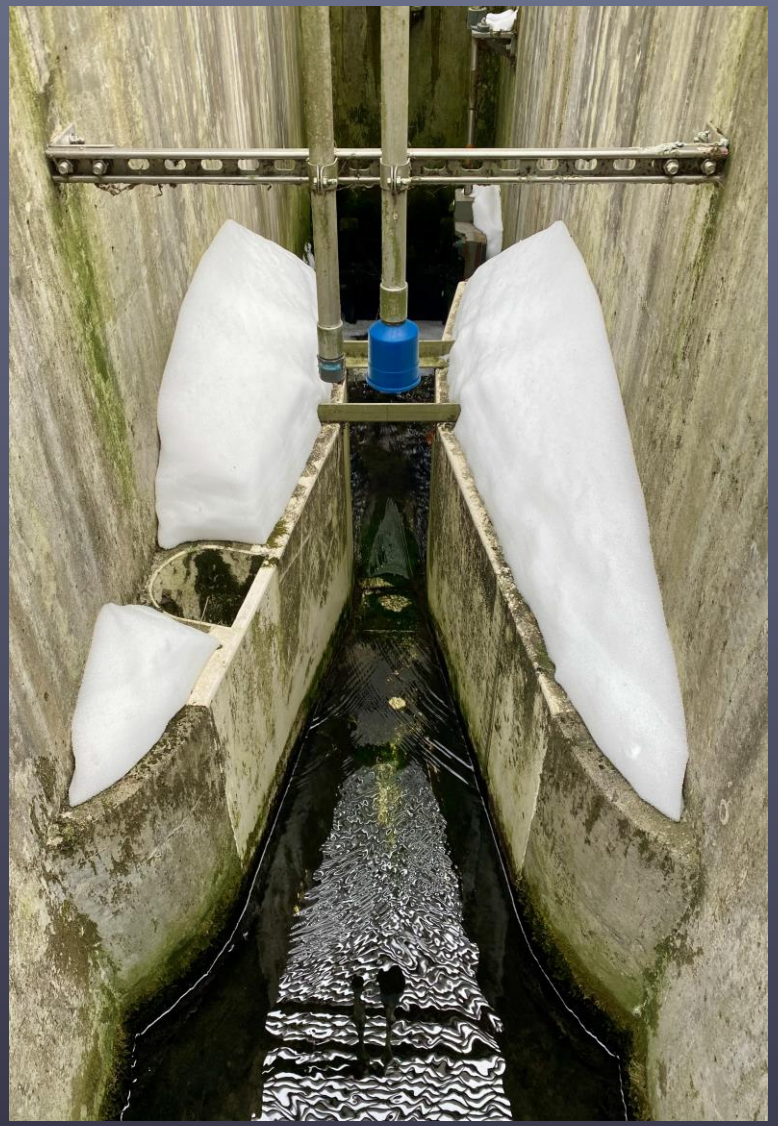
# DISINFECTION

FILTERED EFFLUENT IS DIRECTED TO THE UV CHANNEL.

ULTRAVIOLET LIGHT IS USED TO INACTIVATE ANY PATHOGENS WHICH ARE STILL PRESENT.

AUTOMATIC WIPERS KEEP THE LAMP SLEEVES CLEAN TO MAXIMIZE UV LIGHT INTENSITY.

A WEIGHTED GATE MAINTAINS A STEADY CHANNEL DEPTH.



# FLOW MEASUREMENT

CONVERGING WALLS FORM WHAT IS CALLED A PARSHALL FLUME.

BY MEASURING THE WATER SURFACE HEIGHT, A PREDICTABLE RISE CORRELATES INTO A FLOW VOLUME.

THIS VOLUME MEASUREMENT IS TRACKED CONTINOUSLY AND IS A KEY PART OF DISCHARGE MONITORING AND REPORTING.

FINAL EFFLUENT IS DISCHARGED DIRECTLY INTO THE FARMINGTON RIVER.

THIS WRAPS UP LIQUID TREATMENT.

NOW ONTO SOLIDS HANDLING.

# SOLIDS HANDLING

TWO CYLINDRICAL HOLDING TANKS CONTAIN THE LIQUID SLUDGE REMOVED FROM BOTH PRIMARY AND SECONDARY CLARIFICATION PROCESSES.


# SLUDGE PUMPING

SOLIDS THAT SETTLE IN THE PRIMARY AND SECONDARY CLARIFIERS ARE PUMPED USED SPECIAL SLUDGE PUMPS.

HERE ARE OUR (4) DOUBLE-DISC PUMPS.

1 IS A SECONDARY WASTE PUMP.

3 ARE PRIMARY SLUDGE PUMPS.

# REDUCING VOLUME OF HAULED SLUDGE

SOLIDS SEPARATE IN THE HOLDING TANKS, LEAVING POCKETS OF LIQUID WITH VERY LITTLE SOLIDS.

THIS LIQUID IS CALLED SUPERNATANT. IT IS DECANTED OFF BY TAPPING INTO ACCESS PORTS AND DIRECTING IT BACK TO THE LIQUID TREATMENT STREAM.


# REMOVAL OF SLUDGE

LIQUID SLUDGE, TYPICALLY IN THE RANGE OF 3.0-3.5% SOLIDS, IS PUMPS ONTO TANKER TRUCKS.

HERE IS A CENTRIFUGAL PUMP AND A PLUNGER PUMP; BOTH ARE USED TO TRANSFER SLUDGE FROM EITHER HOLDING TANK, ONTO A TANKER.

THE SLUDGE IS HAULED TO HARTFORD MDC FOR INCINERATION.


# ODOR CONTROL

SLUDGE ODORS ARE CONTROLLED USING ACTIVATED CARBON.

THE ODOROUS AIR IS PULLED FROM THE TOP SECTION OF THE HOLDING TANK, ABOVE THE SLUDGE, AND FORCED THROUGH A VESSEL CONTAINING ACTIVATED CARBON.

THE CARBON GRANULES ADSORB THE ODOR COMPOUNDS AND ODOR FREE AIR IS VENTILATED AT THE BUILDING ROOF HEIGHT.

# STAFF AND AUTHORTY

THE SEWER SYSTEM IS OPERATED AND MAINTAINED BY A STAFF OF 4 OPERATORS CERTIFIED TO WORK IN THE INDUSTRY.

THE WATER POLLUTION CONTROL AUTHORITY APPROVES THE COLLECTION AND DISPURSEMENT OF SEWER USE AND CONNECTION FEE REVENUE.

# ROLE AND DUTY

RESPONSIBLE POLLUTION CONTROL SUPPORTS GROWTH IN THE AREAS THE COMMUNITY WANTS TO DEVELOP.

RESPONSIBLE UTILITY MANAGEMENT ALLOWS US TO MAINTAIN THE DELICATE NATURAL AND AQUATIC ENVIRNOMENTS WE AIM TO CONSERVE.

# THANK YOU

OUT OF SIGHT AND OUT OF MIND, THE SEWER UTILITY IS OFTEN OVERLOOKED.

THIS PRESENTATION WAS DESIGNED TO EDUCATE THE AUDIENCE ON THE CRITICAL NATURE OF THIS PUBLIC ASSET.