

Draft

Cost of Service Study

Ohio Street Storage

for

Racine Wastewater Utility

Revised March 7, 2012



City of Racine, Wisconsin

© 2012 Copyright Ruekert & Mielke, Inc.



Ruekert·Mielke

engineering solutions for a working world

AECOM

Project: Ohio Street Storage

Problem/Issue

Homes on Virginia Street, from Ridgeway Avenue to Westway Avenue, have experienced basement backups from surcharging in the Virginia Street 21-inch interceptor sewer. This interceptor sewer is shallow; even small surcharge levels produced basement backups on Virginia Street. Communities contributing flow to the Virginia Street interceptor sewer include the City of Racine and the Village of Mount Pleasant.

Solution

The Ohio Street storage project was constructed in the fall of 2008 through the spring of 2009. High flows bypass the existing Virginia Street interceptor sewer and are diverted to a 54-inch storage interceptor sewer on Ohio Street, which eventually lead back to the interceptor sewer system downstream of Lockwood Park. The majority of storage volume was provided within Lockwood Park, consisting of dual-barrel 54-inch sewers. Flows into and out of the storage interceptors are controlled by vortex valves. Although storage on Ohio Street was not required to alleviate basement backs on Virginia Street, it does provide benefit to the downstream interceptor system through attenuated peak flows. This benefit translates to reduced downstream infrastructure requirements, recommended in the Storage Optimization Plan: specifically, a reduction in size of the West Boulevard diversion interceptor sewer. See Figure 1 for a schematic of the Ohio Street storage facility.

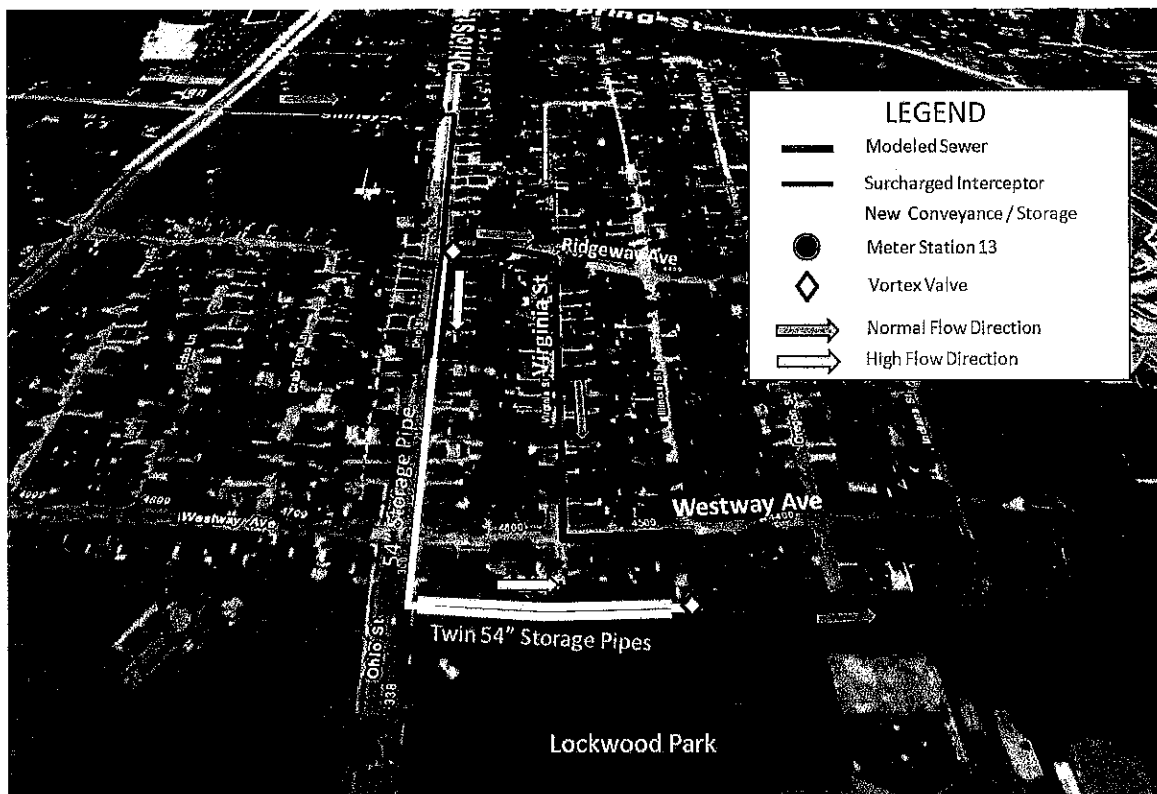


Figure 1. Ohio Street Storage

Racine Wastewater Utility
Cost Allocation Study
Ohio Street Storage

I. Introduction

In 2008, the Racine Wastewater Commission approved the construction of a 54-inch diameter sewer in Ohio Street to provide in-line storage for diversion of wet-weather flows from the Virginia Street Interceptor. This facility was provided in order to mitigate basement backups within the Virginia Street area and bypassing at Safety Sites 05 and 06, such as were experienced during the August 19-20, 2007 storm event. Also, as noted in the engineering project description, although storage was not required at Ohio Street in order to prevent basement backups on Virginia Avenue, it does provide benefit to the downstream interceptor system through attenuated peak flow. This benefit results in reduced downstream infrastructure requirements and costs as noted in Section III below. Specifically the storage at Ohio Street allows for a reduction in size of the downstream West Boulevard diversion interceptor.

According to the terms of the 2002 Sewer Service Agreement, a cost of service allocation is required for any new facilities that expand the capacity of the Commission's wastewater treatment or conveyance system. This report summarizes the proposed cost of service allocation for the proposed West Boulevard Diversion Project.

II. General Framework of the Agreement

The Sewer Service Agreement defines different types of capital costs and specifies different approval processes and methods of funding for each.

"Existing Capital Costs" are defined in Section 1.32 as all capital costs expended by the Racine Utility prior to the date of the Agreement. The Utility retains sole ownership of "existing capital costs" and is allowed under Section 6.4 of the Agreement to charge a rate of return on them through the sewer rates.

"Minor Unplanned Upgraded Facilities" are paid for by the Utility and are recovered through the sewer rates, as if they were "existing capital costs". These facilities must meet the following criteria:

1. They are unplanned—that is, not contemplated in the 1998 facility plan.
2. They are upgrades to the sewer service facilities—they do not provide an increase in treatment capacity or conveyance capacity.
3. Their costs must total less than \$2,000,000 per year (adjusted for inflation).

As outlined in Section 3.5, there is no cost of service allocation for these facilities. However, the Commission must notify all of the parties following its decision to treat capital costs as existing capital costs under this provision.

“Unplanned Upgraded Facilities” that are not treated as existing capital are paid for directly by each party in proportion to their current percentage share of total Allocated Treatment Capacity. As defined in Sections 1.114 and 1.115, these facilities must meet criteria 1 and 2 above. Under Section 3.4, these facilities require the preparation of a cost of service allocation and 40 days prior written notice to all of the parties.

“Unplanned Expanded Facilities”, defined in Sections 1.33 and 1.114 are facilities not contemplated in the 1998 facility plan which create additional treatment or conveyance capacity. Under Section 3.6 these facilities do not have to be provided unless one or more parties agree to accept and pay for the additional capacity. A cost of service allocation must be prepared and each of the parties pay for the capital cost in proportion to the amount of the expanded capacity purchased.

III. Cost of Service Allocation

Since the proposed project will provide additional conveyance capacity over and above the existing capacity, the cost should be treated as “Unplanned Expanded Facilities”. The cost should be allocated according to the additional conveyance capacity requested by each of the parties.

The total cost for this project is \$1,554,106. The project was designed to provide benefit to the downstream West Blvd. Diversion project. The estimated cost benefit to the West Blvd. project associated with a reduction in size is \$704,106 and therefore for purposes of the Ohio Street cost allocation, the total cost will be reduced by this amount resulting in net amount of \$850,000 that will be allocated to parties contributing flows to the study area.

A two-step process was used to allocate the costs for the proposed storage:

1. Determine the existing allocated conveyance capacity and projected future capacity needs for areas contributing to the proposed facility.
2. Allocate the costs on the basis of the projected increases in conveyance capacity needs for each of the parties.

Each of the steps is described below.

Step 1: Determine Existing and Future Conveyance Capacity Allocations

The attached Table 1 shows the existing allocated capacity for each of the areas contributing to the proposed facility. The contributing areas include all areas that are tributary to the proposed storage facility as modeled by AECOM.

Table 1 also shows the projected future capacity needs for each of the metered and unmetered areas contributing to the proposed facility. These figures are based on the modeled 2035 conveyance system flows for a 40-year recurrence storm event. The same methodology was used to determine the amounts contributed by Racine.

Step 2: Allocate Costs

The costs were allocated between the parties on the basis of the percentage of additional conveyance capacity needed by each party. The additional capacity was determined based on the amount by which each party is projected to exceed its existing allocated capacity by 2035. This was computed by subtracting the party's existing capacity from its projected 2035 flows. As shown in Table 1, the total capacity exceedance is projected to be 2.659 million gallons per day (MGD), of which Mount Pleasant accounts for 73% and Racine accounts for 27%. Caledonia is not projected to exceed the current capacity allocation. Therefore, the costs are proposed to be allocated 27% to Racine and 73% to Mount Pleasant.

If any of the parties were to request more or less capacity than what is projected by the system modeling, the change in requested capacity would result in variation from this proposed cost of service allocation.

Table 1
Racine Wastewater Utility
Ohio Street Storage Cost of Service Allocation

| | Mount Pleasant | Caledonia | Racine | Total |
|---|------------------|--------------|--------------|--------------|
| Community Flow Allocations | | | | |
| 2020 Facility Plan Mike Urban Model Flows ⁽¹⁾ | | | | |
| MP #13 | 1.409 | | | |
| MP #13 Downstream (Unmetered) | 0.177 | | | |
| Total | 1.586 | 0.000 | 1.278 | 2.864 |
| Storage Optimization Study Design Flows ⁽²⁾ | | | | |
| MP #13 | 3.070 | | | |
| MP #13 Downstream (Unmetered) | 0.446 | | | |
| Total | 3.516 | 0.000 | 2.007 | 5.523 |
| Revised Flow Allocations (Peak Flow MGD) ⁽³⁾ | | | | |
| MP #13 | 3.070 | | | |
| MP #13 Downstream (Unmetered) | 0.446 | | | |
| Total | 3.516 | 0.000 | 2.007 | 5.523 |
| Compute Exceedance of Capacity | | | | |
| Revised Capacity Allocation | 3.516 | 0.000 | 2.007 | 5.523 |
| less: | | | | |
| Original Facility Capacity Allocation | 1.586 | 0.000 | 1.278 | 2.864 |
| Exceedance | 1.930 | 0.000 | 0.729 | 2.659 |
| Exceedance Share (maximum 100%, Minimum 0%) | 73% | 0% | 27% | 100% |
| Compute Community Cost Shares | | | | |
| Total Project Cost | \$1,554,106 | | | |
| Less Downstream Benefit Share ⁽⁴⁾ | \$704,106 | | | |
| Net for Cost Allocation | \$850,000 | | | |
| Mount Pleasant Share | \$616,961 | | | |
| Caledonia Share | \$0 | | | |
| Racine Share | \$233,039 | | | |
| Total | \$850,000 | | | |

Notes:

1. Source: 2020 Facilities Plan Flows (Mike Urban Model Results).
2. Source: 2035 Storage Optimization Study Design Flows (Mike Urban Model).
3. Represent greater of: original capacity allocation or 2035 design flow modeling non-coincidental peak flow.
4. Represents the additional cost to provide storage rather than conveyance upgrades in order to provide additional downstream benefits to the West Blvd. Diversion project (Source: AECOM).

Legend

Basins Tributary to Project by Municipality

- Racine
- Mt Pleasant

Modeled Pipes

- Gravity Pipe
- Force Main
- Conveyance Upgrades



WWTP



Meter Locations



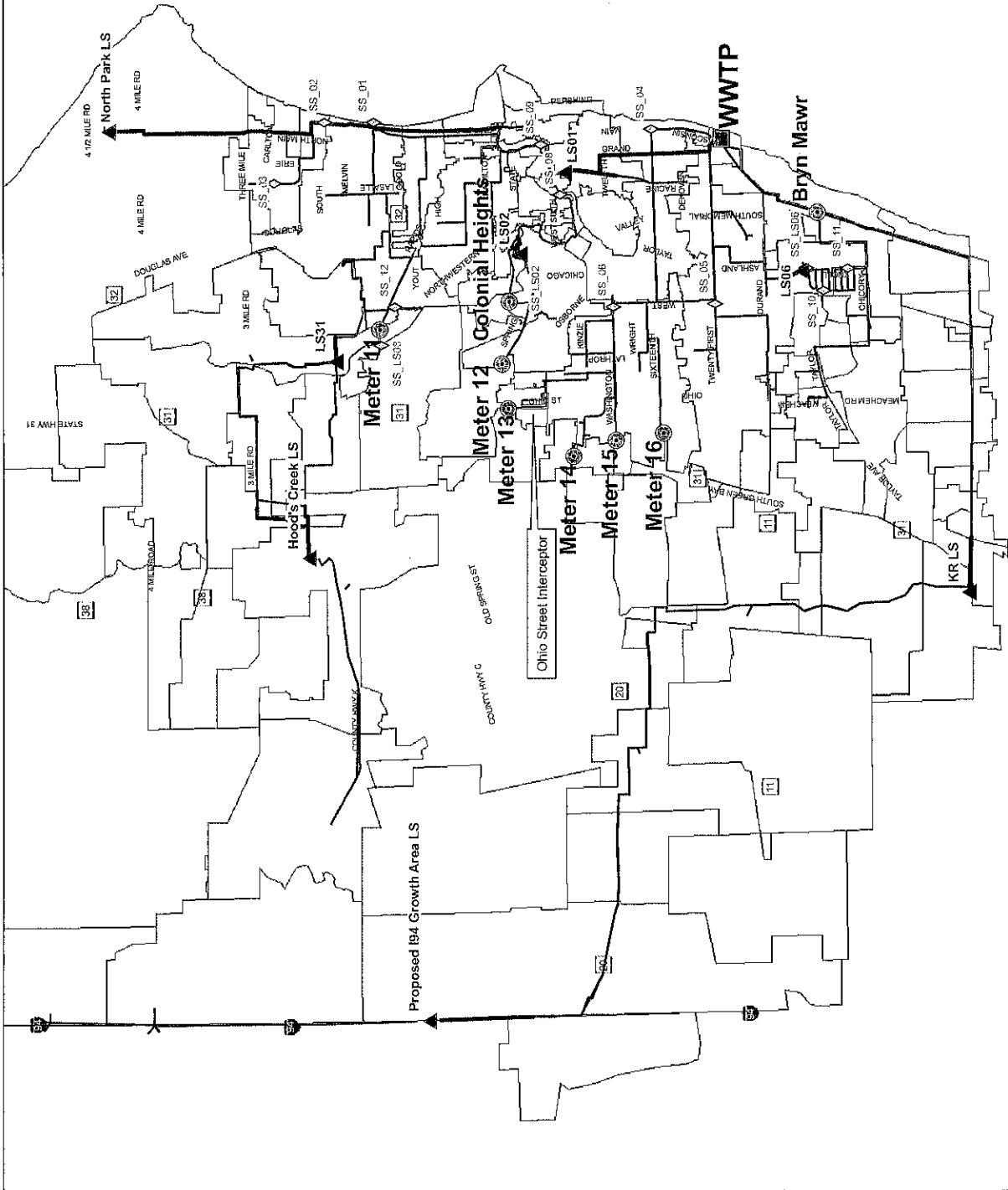
Lift Stations (Modeled)



Safety Sites



0 2,500 5,000 Feet



Alternative 5E

Basins Tributary to the Ohio Street Interceptor Upgrades, by Municipality

Racine Water and Wastewater Utility
Cost Allocation Study

AECOM

February 2012

Project: 60184227