Dane County Urban Water Quality Grant Application Narrative

Background: Bayview's Mission, History and Demographics

Bayview Foundation is an affordable housing community with the mission to support its culturally diverse, low-income residents in realizing their aspirations by providing quality housing, fostering cultural pride, and building community through the arts, education and recreation.

Located in the site of Madison's historic Greenbush community, Bayview was created in 1966 by civic activists who opposed the city's displacement, via urban renewal, of impoverished residents. By 1971, the organization developed 102 townhouse units at the intersection of Regent Street and West Washington Avenue.

From the start, the Bayview community has been unusually diverse. Its 310 residents include many from immigrant and refugee backgrounds. Currently, 48% are Hmong; 10% Vietnamese, Cambodian or Laotian; 25% Latinx; 15% African/African American; and 2% are white or Native American.

Despite its diversity and high poverty rate (the average annual income is $17,000), the Bayview community is remarkably cohesive and vibrant. A primary contributing factor is the Bayview Community Center, which plays host to many events and gatherings, and provides children and adults with educational experiences and connects them with support services throughout the county. During non-Covid times, the Center welcomes over 100 people per day and more than 75% of Bayview residents participate in center activities.

Redevelopment: Preparing for the Future

While the Bayview community thrives, its 50 year-old infrastructure is seriously aging. A 2016 capital needs assessment of all the buildings on the site found that there are numerous infrastructure challenges and most, if not all, the major structures would need to be fully renovated and/or rebuilt. Additionally, the neighborhood sits very close to lake levels and has been vulnerable to flooding. Bayview's Community Center floods every year, and the flood event in 2019 impacted the townhouses as well. After an extensive evaluation, it was decided that a full redevelopment is the Foundation's only financially feasible option for continuing to provide affordable housing and neighborhood services.

Resident Engagement: Voice and Equity in Design Planning

Starting in 2018, Bayview staff initiated a comprehensive redevelopment planning and engagement process. In addition to evaluating our needs in regards to a development partner and project financing, Bayview started a two year resident engagement project in order to best understand the needs, priorities, hopes and fears of the residents. Since spring 2018, more than 70% of Bayview residents have participated in over 25 in-person meetings, door-to-door household surveys and informational sessions related to the redevelopment project. A group of four residents, community leaders and local architects also participated in a six week design justice project to ensure that the architecture of the new buildings would reflect the needs, aesthetics and aspirations of low income residents of color. Equity and racial justice are cornerstones of this work and Bayview aspired to include and respond to the voices of as many residents, of all ages, backgrounds and cultures as possible, in the planning and design efforts.

In keeping with residents hopes and wishes, Bayview designed a site that includes as much green space as possible, limits the heights of the new buildings and pushes much of the parking

underground. The new site includes more resident gardens and spaces to grow food as well as a new open green space in the middle of the site for children and adults to gather and play. The new community center will be larger (twice the size of the current one) and will be located just off the new road, La Mariposa Lane, and adjacent to the community green. The new center will feature a green roof. The new Bayview will include 130 units, most of which will be accessible, and will serve over 500 residents. The community center will be available to many more users with expanded programming, services and hours.

Focus on Sustainability

The emphasis on sustainability is part of an intentional effort to address inequities in housing. Often in low-income communities, stormwater management, solar, passive house and other sustainability features are not built into development projects because they are considered "extras", and not prioritized. As a result, these communities end up disproportionately impacted by effects of heat, poor air quality, flooding, extreme weather, higher utility bills and pollution.

Through a multiyear partnership with Slipstream, and in concert with SmithGroup and the other designers and engineers hired for the project, Bayview established high-achieving energy goals, including:

- lower energy bills
- increase health and wellness through the following: air quality, water quality, eliminating pests in housing, reducing exposure to chemicals and contaminants, promoting active lifestyle, increasing connection and easy access to nature and beauty
- ensure safety during serious weather events including flooding, excessive heat and cold, loss of power, tornados
- create awareness of energy usage and its environmental impacts

Because it is located in the heart of Madison's downtown, this redeveloped Bayview will be highly visible and easily accessible to the community, and can serve as a model for what's possible in rebuilding affordable housing. And with integrated art and educational components highlighting its energy efficiency innovations, it has the potential to inspire conservation work for generations to come.

Stormwater Management and Water Conservation & Education Practices

As early as 2019, Bayview was in conversation with Dane County engineers to discuss water conservation, quality and stormwater management, including features that would significantly exceed the stormwater management required to meet city and state standards, as well as educational components to illustrate and support water conservation and education. The following strategies and features are integrated into the redevelopment and make up the basis for this funding application:

PERMEABLE PAVERS

Approximately 2,000 square feet of additional permeable pavement in the eastern parking lot.

COMMUNITY GARDENS WATER COLLECTION AND IRRIGATION

A runoff capture system intended to intercept, store, and pump rooftop runoff for use in irrigating community gardens. Components of this system will include the interception, conveyance, and pumping system itself and engineered soils in the community gardens.

AMENDING SOIL AND ADDING NATIVE PLANTINGS

Replacement of traditional turf areas in green spaces with native plantings to increase infiltration and evapotranspiration to reduce runoff volume from the site. The redeveloped Bayview will include community gardens. Amending the soil of these plots with higher quality organic matter will improve the gardening output and increase the land's absorption. Adding native seeding and deep-rooted plantings will add high ecological value to the project and further enhance absorption. Native vegetation in Bayview's extensive gardens will also provide a habitat for pollinators.

GREEN ROOF

Bayview's new Community Center will feature a roof-top patio surrounded by a 700 square ft. green roof, visible from the ground. The deep-rooted system also ensures it will rarely need irrigation. And the deeper tray provides an added educational benefit, as more of the plantings are visible.

INTERPRETIVE, EDUCATIONAL SIGNAGE

To bring a strong educational component to the overall project, Bayview's stormwater features will be highlighted for visitors through interpretive signage throughout the campus. It will be pictorial-based (to be sensitive to language and cultural differences), and arranged so that people can take a self-guided tour to learn about and interact with the latest technologies to redirect water from storm systems. In addition to signs specific to the stormwater management strategies, additional signage will highlight various cultural aspects of water. Equity within representation and cultural knowledge will guide this work with local artisans hired to design and craft the signage.

STORMWATER & WATER CONSERVATION ARTWORK

Bayview will install a water-based educational artwork outside the community center and adjacent to the playground. Using water collected from the southeastern corner of the center's rooftop, water will be routed to an artisan crafted trench drain that will pass across the floor of the plaza and flow into an impactful artwork that highlights the value of water and the importance of water conservation. This piece will be designed and fabricated by a local or regional artist with the primary purpose being to spark engagement and interest in the issues of water justice and conservation.

<u>Summary</u>

This application to Dane County encompasses a wide range of stormwater management features along with educational signage and interpretive artwork. The array of strategies utilized in our application highlight Bayview's holistic approach to conservation in the realm of water management and stewardship. The site, which is within a mile from the capital and next to Monona Bay, will be a model of how to intentionally and artistically integrate innovative and efficient stormwater management practices within an affordable housing development in Dane County. Given climate change and its immense impact on water resources, Bayview's efforts are needed now more than ever in order to divert stormwater, conserve water, and educate the public about water justice and conservation.

SMITHGROUP

February 2, 2021

Jeremy Balousek
WRE Division Manager
DANE COUNTY LAND & WATER RESOURCES DEPARTMENT
5201 Fen Oak Driver, Room 208
Madison, WI 53718-8827

Re Bayview Townhomes – Green Infrastructure Technical Report

Dear Jeremy,

As we have discussed, the Bayview Foundation is currently designing improvements to the Bayview Townhomes, located near the intersection of West Washington Avenue and Regent Street in Madison (Figure 1). A critical component of the project is maximizing sustainable elements, with an emphasis on implementation of green infrastructure practices. In support of this goal, the Bayview Foundation is seeking assistance through the Dane County Water Quality Grant program. Prior to submitting this application, we have prepared the following report to provide the technical basis and performance metrics for the proposed improvements for which funding is being requested.

Project Site

The 5.7-acre site currently consists of five multi-family residential buildings, a community center, two parking lots, driveways, walks, and green space. Proposed construction includes phased demolition of the existing five apartment buildings, community center, and all pavement surfaces on the 5.7-acre site, construction of 10 new multi-family buildings, a new community center building, two parking lots including a total of 50 parking spaces, walks, community gardens, and landscaped areas. In addition, a new 66-foot public right-of way will be dedicated on the western edge of the site to connect West Washington Avenue, Braxton Place, and Regent Street (Figure 2). The proposed development will increase the overall site imperviousness from 55% to 61%, for an increase in impervious surface of approximately 16,300 square feet (0.374 acres). The overall site plan is included in Attachment 1.

Figure 1 - Project Location

Minimum Post-Construction Stormwater Management Requirements

Stormwater runoff from the project site is governed by Chapter 37 of the Madison Code of Ordinances and DNR Chapters NR 216 and NR 151. Under both requirements, the site is considered a redevelopment. The basic stormwater management design is based on the Madison code since it is more stringent than DNR for this site. Under Chapter 37, the project must provide a minimum 60%

reduction in total suspended solids (TSS) from driving and parking areas. Calculations suggest that approximately 6,500 square feet of permeable pavers in the parking lots would be required to meet the City's stormwater management requirements. Provision of this area would exceed DNR requirements.

Figure 2 - Proposed Site Concept

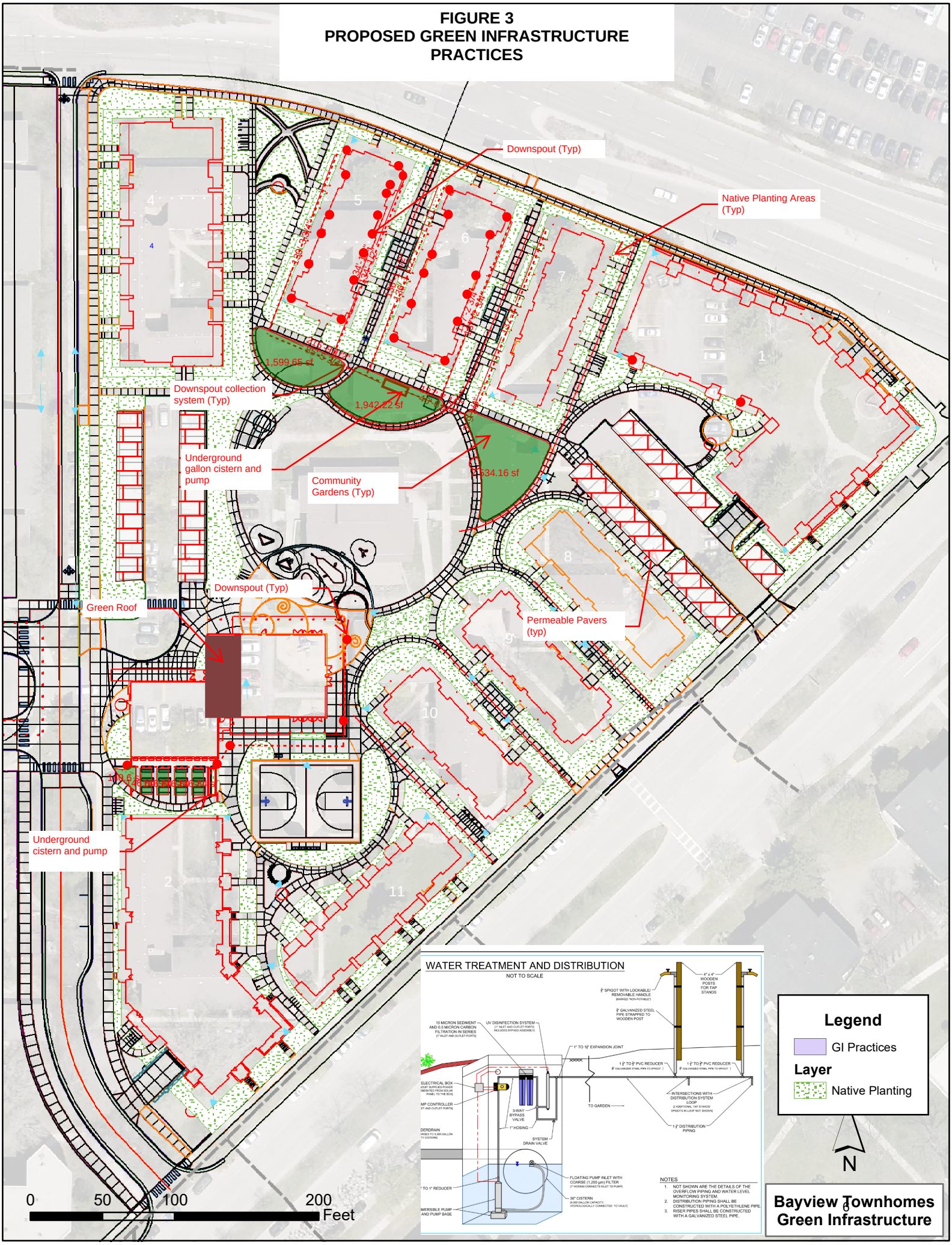
Proposed Green Infrastructure Practices
In addition to meeting the minimum regulatory requirements, the Bayview Foundation wishes to implement additional measures to showcase site sustainability if sufficient funding can be procured. Proposed additional measures include:

- Approximately 2,000 square feet of additional permeable pavement in the eastern parking lot.
- A runoff capture system intended to intercept, store, and pump rooftop runoff for use in irrigating community gardens. Components of this system will include the interception, conveyance, and pumping system itself and engineered soils in the community gardens.
- Replacement of traditional turf areas in green spaces with native plantings to increase infiltration and evapotranspiration to reduce runoff volume from the site.
- An 870 square foot green roof on a portion of the community center.

Figure 3 schematically shows the locations and coverage of proposed green infrastructure features.

Green Infrastructure Practice Analysis and Results
The following section describes the design methodology and impacts of each of these measures.

FIGURE 3
PROPOSED GREEN INFRASTRUCTURE PRACTICES



Permeable Paver System

Approximately 8,500 square feet of permeable pavers are proposed in the east and west parking lots (Figure 3). The permeable paver system is designed in accordance with the WDNR Technical Standard 1008 – Permeable Pavement (Figure 4). The west paver system will capture runoff from a 24,700 square foot area, including the 9,000 square foot parking lot. The east paver system will capture runoff from the 8,400 square foot parking lot.

The project site includes approximately 20,000 square feet of parking and driving surfaces, including the east and west parking lots and the north and south parking structure entrances. Pollutant loading calculations indicate that approximately 283 pounds of total suspended sediment (TSS) will drain from this area annually. Compliance with City post-construction stormwater management standards requires capture of 170 pounds of TSS annually. The 8,500 square foot permeable paver system currently proposed will capture approximately 207 pounds of TSS annually (60% of driving surface total) according to calculations using the WinSLAMM model in conformance with City of Madison and DNR protocols. This exceeds the city standard by approximately 37 pounds per year. Based on this, approximately 1,700 square feet of permeable paver area, which equates to the permeable pavers in the north parking bays of the east parking lot, will be provided in excess of the regulatory requirement. Based on our prior discussions, we understand the cost of constructing these additional pavers may be reimbursable under the grant program.

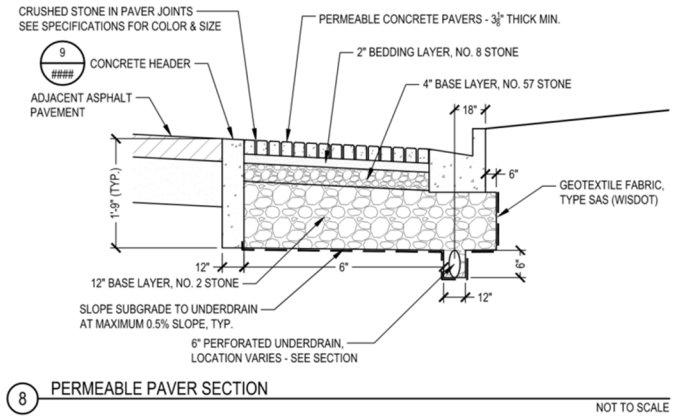


Figure 4 - Proposed Permeable Paver Section

In addition to addressing TSS reduction requirements, use of permeable pavers will also provide substantial reductions in runoff volume compared to use of asphalt pavement. WinSLAMM calculations indicate that the 8,500 square foot permeable paver system (including the parking lots and contributing adjacent areas) will reduce overall runoff volume by approximately 198,000 gallons annually compared to conventional asphalt paving. Supporting calculations are included in Attachment 2.

Rooftop Runoff Capture System

The Bayview Foundation intends to provide approximately 7,000 square feet of community gardens for Bayview residents. The proximity of the gardens to the northern townhomes and the community center offer an opportunity for capturing rooftop runoff for use in irrigating the gardens. The northern system will capture runoff from the rooftops of Buildings 5, 6, and the western half of Building 7, an area of approximately 10,000 square feet, and convey it by means of a separate PVC storm sewer system to a 15,000-gallon underground cistern located south of the buildings (Figure 5). The southern system will capture runoff from the Community Center rooftop, an area of approximately 7,600 square feet, and convey it by means of a separate PVC storm sewer system to a 10,000-gallon underground cistern located south of the building (Figure 6). For both systems, underground conveyance and storage is necessary to isolate the rooftop runoff from surface runoff, which would add an undesirable amount of surface contaminants to the irrigation system.

Anticipated features of the north system include:

- Approximately 900 linear feet of 6-inch PVC pipe to collect roof drainage from 33 downspouts.
- A 15,000-gallon modular cistern ("EcoBloc" Modular Water Storage System, or equivalent).
- A disinfection system
- A 10 -20 gpm pump and controls to distribute stored runoff to two spigots for access by residents.
- Soil mix spread over 6,100 square feet of community gardens.
- An overflow connection to the primary storm sewer system.

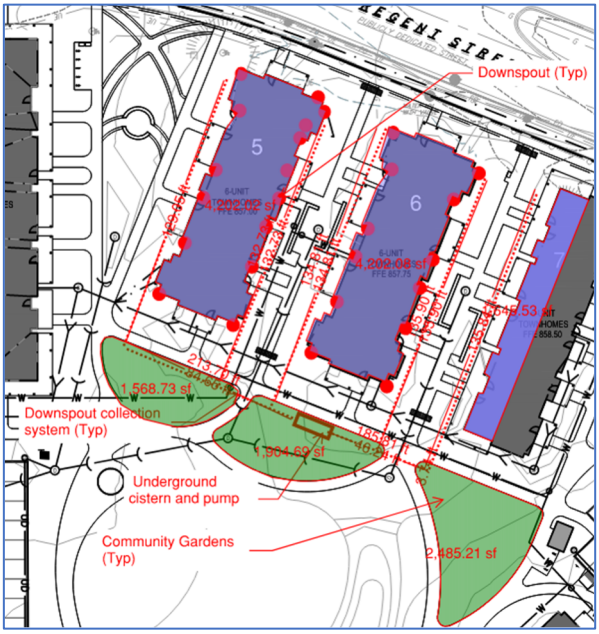


Figure 5 - North Irrigation System

The south system will include similar components, as follows:

- Approximately 300 linear feet of 6-inch PVC pipe to collect roof drainage from 5 downspouts.
- A 10,000 -gallon modular cistern ("EcoBloc", or equivalent).
- A disinfection system
- A 10-20 gpm pump and controls to distribute stored runoff to two spigots for access by residents.
- Soil mix over 570 square feet of community garden area.
- An overflow connection to the primary storm sewer system.

Annual runoff reduction volumes provided by the system were calculated by the following methodology:

1. The 1981 rainfall series, excluding winter months, was extracted from the WinSLAMM rainfall parameter file and loaded into an Excel spreadsheet.
2. Runoff from each contributing area was calculated and allowed to accumulate in each cistern until the accumulated volume exceeded the storage volume available. The runoff volume exceeding the cistern capacity was assumed "lost".

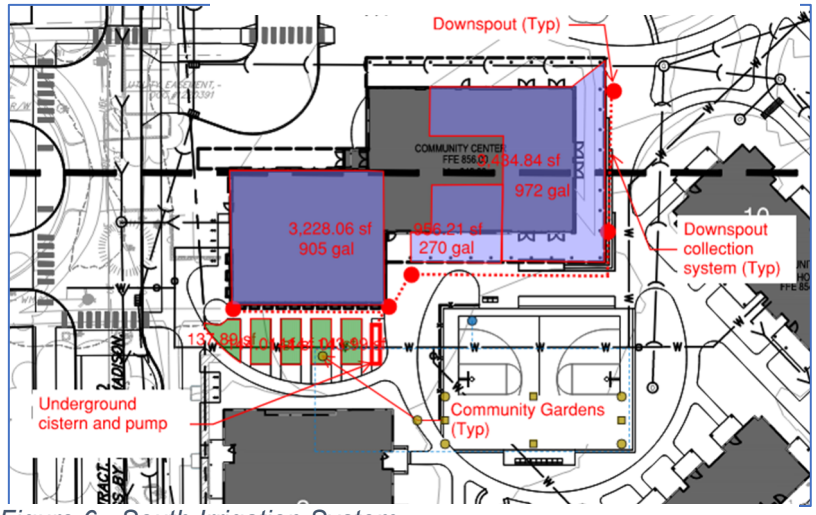


Figure 6 - South Irrigation System

3. A spreadsheet was developed to evaluate the fill-drain sequence of the cistern and pumps. The fill rate was calculated as described in 1 and 2, above. The drain rate was calculated based on the following assumptions:
    a. Each cistern will be connected to two spigots for resident use.
    b. The irrigation system will only be used after June 1 and before October 15. For the most part, runoff to the cistern outside the growing system will either be stored in the cistern or diverted to the storm sewer system.
    c. The flow rate through each spigot will be in the range of 10 gallons per minute (gpm)
    d. Each spigot will operate, on average, 75 minutes per day (75 min x 10 gal/min x 2 spigots). Based on this, the drawdown rate from the cistern is assumed to be 1,500 gallons per day.
    e. The volume of water stored in the cistern is be the sum of the storage volume at the start of an event plus the inflow volume from the event itself. Following the event, the cistern will be drawn down based on 1,500 gal/day times the number of days between each event.
4. The total annual runoff reduction was estimated to be the difference between the total runoff volume minus the overflow volume.

Based on this procedure, the north irrigation system could capture and reuse approximately 147,000 gallons and the south system could capture and reuse approximately 120,000 gallons annually. This represents reduction in annual runoff volume from the 17,600 square foot rooftop areas of over 90%. Supporting calculations are included in Attachment 3.

Native Plantings

Approximately 37,000 square feet of green space is proposed to be planted with native plantings rather than traditional turf (Figure 3). The potential reduction in runoff volume as follows:

1. The 1981 rainfall series, excluding winter months, was extracted from the WinSLAMM rainfall parameter file, and loaded into an Excel spreadsheet.
2. Volumetric runoff coefficients were estimated by dividing the runoff depth by rainfall depth for a range of storm events. Runoff depths were estimated using NRCS methodology per TR-55 using the following equation:

$$Q = \frac{(P - I_a)^2}{(P - I_a) + S} \qquad \text{[eq. 2-1]}$$

where

Q = runoff (in)
P = rainfall (in)
S = potential maximum retention after runoff begins (in) and
I_a = initial abstraction (in)

This methodology was used instead of the small storm hydrology methodology in WinSLAMM because the NRCS methodology better addresses vegetation types and soil compaction, whereas WinSLAMM coefficients are more impacted by soil compaction alone. The runoff coefficient for turf was based on “typical” development assumptions- a compacted lawn condition

(i.e., RCN = 80). The native planting condition was based on a meadow with low compaction (i.e., RCN =58). Based on this methodology, runoff coefficients ranged from 0.0 for storms of one inch or less to 0.23 for a 5-inch rain depth. The runoff coefficient for lawn generally ranged from 0.08 for a 1-inch depth of 0.58 for a 5-inch rain depth (Table 1).

Rain Depth (in.)	HSG A		HSG B		HSG C		HSG D	
	Lawn (CN=39)	Native (CN=30)	Lawn (CN=61)	Native (CN=58)	Lawn (CN=74)	Native (CN=71)	Lawn (CN=80)	Native (CN=78)
	39	30	61	58	74	71	80	78
1	0	0	0.00	0.00	0.02	0.01	0.08	0.06
2	0	0	0.04	0.02	0.17	0.13	0.28	0.24
3	0	0	0.12	0.09	0.30	0.25	0.42	0.38
4	0.01	0	0.20	0.17	0.40	0.35	0.51	0.47
5	0.04	0	0.27	0.23	0.47	0.42	0.58	0.54

Table 1 - Runoff Coefficients - Turf Versus Native Plantings

3. Runoff volumes were calculated for each recorded storm event per the WinSLAMM rainfall file by multiplying runoff coefficients for the event rain depth times the surface area (37,407 square feet) for the lawn condition and the native planting condition.
4. The total annual runoff volume was calculated by adding the runoff volumes from each individual storm event.
5. The total annual runoff reduction was calculated as the difference between the runoff volume from the turf condition minus the runoff volume from the native planting condition.

Results indicate that the use of native plantings would reduce the runoff volume from the 37,400 square foot area by as much as 628,000 gallons annually, representing a reduction of over 95% compared with planting with standard turf grass. Supporting calculations are included in Attachment 4.

Green Roof

An extensive green roof is proposed over an 871-square foot portion of the new Community Center (Figure 7). The current green roof design calls for placement of a tray system (LiveRoof) having a six-inch soil depth. The annual volume capture was estimated by the following methodology:

1. The 1981 rainfall series, excluding winter months, was extracted from the WinSLAMM rainfall parameter files, and loaded into an Excel spreadsheet.

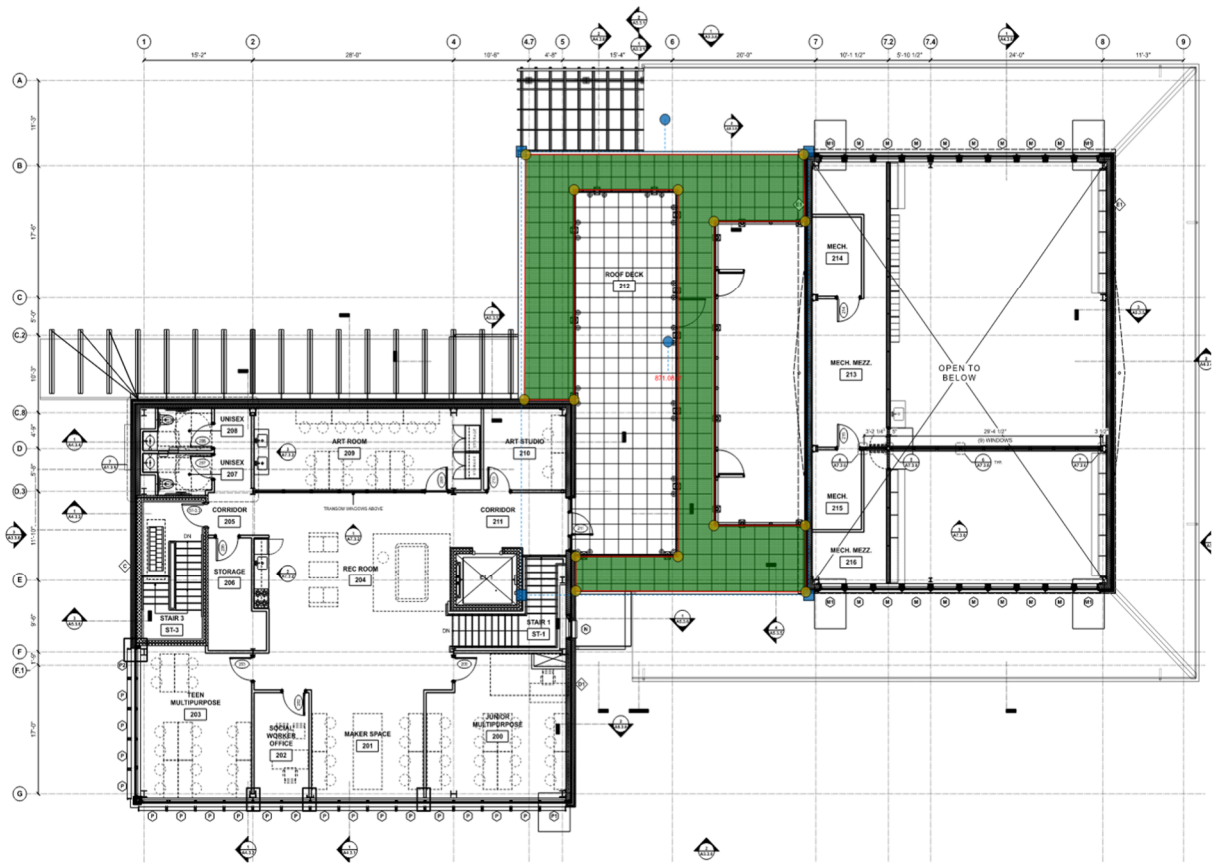


Figure 7 - Community Center Green Roof

2. The available water retention capacity was calculated by multiplying the total tray surface area times the tray depth times the porosity of the soil media (approximately 870 square feet times 0.5 feet times 25%).
3. The volume of rainwater captured for each series of storm events was estimated by multiplying the rainfall depth times the tray area times the soil porosity. The capture volume for the series of events was assumed to be 100% of the rain depth over the green roof system as long as the capture volume was less than the tray system capacity. The volume exceeding the tray system capacity was assumed to be "lost". The system was expected to have full capacity (i.e., no saturation) as long as the period between storm events exceeded 2 days (in other words, the retained water would be fully evapotranspired within a two-day period).
4. The total annual runoff reduction was the sum of the captured runoff volume for each discrete series of runoff events.

Calculation results indicate that the proposed green roof would capture approximately 49,200 gallons of stormwater runoff annually, providing an annual reduction in runoff volume from the 870 square foot rooftop area of over 73% compared to a traditional rooftop. Supporting calculations are included in Attachment 5.

Overall Project Impacts:

WinSLAMM modeling indicates that approximately 285,000 cubic feet (2.1M gallons) of stormwater drains from the existing 5.72-acre site annually to Lake Monona via adjacent storm sewers. Without green infrastructure practices, proposed redevelopment would increase this runoff volume to approximately 358,000 cubic feet (2.7M gallons) annually because of the added impervious area and soil compaction (Table 2).

Condition	Site Area (Ac)	Runoff Volume	
		cf/yr	gal/yr
Existing Conditions	5.72	285,127	2,132,750
Proposed Conditions (wo/Pr)	5.72	357,875	2,676,905
Proposed Conditions (w/Pr)	5.72	186,695	1,396,476

Table 2 – Comparison of Existing and Proposed Runoff Volume

Proposed green infrastructure practices summarized in this report will capture an average of approximately 171,000 cubic feet of runoff (1.2M gallons) per year (Table 3).

GI Practice	Runoff Volume Captured	
	cf/yr	gal/yr
Existing Conditions	26,444	197,801
N Cistern	19,642	146,919
S Cistern	16,053	120,075
Native Plantings	83,948	627,930
Green Roof	25,094	187,703
Total Captured	171,180	1,280,429

Table 3 - Summary of Runoff Volume Captured by Proposed Practices

This would reduce annual runoff volume from the 5.72-acre site by approximately 40% compared to existing conditions and approximately 50% compared to proposed conditions with no practices in place.

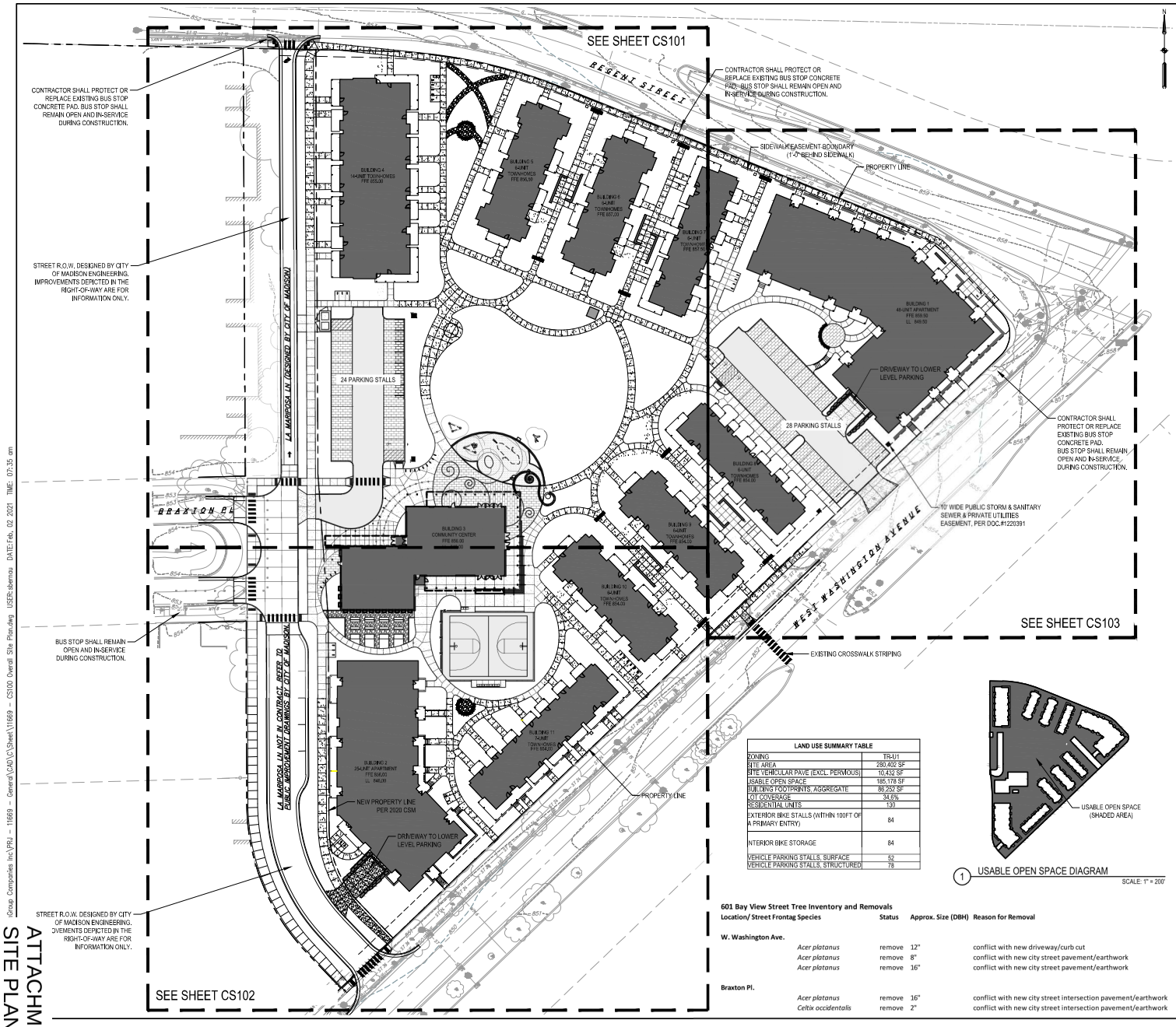
The reductions summarized in this report will provide an incremental benefit to efforts to reduce runoff volume to the Yahara Lakes system, reduce future city and county costs of managing stormwater runoff, and reduce the need for using potable water for irrigation purposes. Further, the project will showcase what is possible in managing on-site water resources without the use of large areas for stormwater detention or biofiltration. The Bayview Foundation will be applying for cost sharing under the Dane County Water Quality Grant program within the next few weeks. We believe this project represents and ideal opportunity to incorporate and showcase green infrastructure practices and we believe these calculations demonstrate the substantial water quality and sustainability benefits the project will provide.

Please review these calculations at your earliest convenience and contact me if you have any questions or comments.

Sincerely,

David Wolmutt, P.E.
Senior Civil Engineer

Copy: Scott Kwiecinski, Horizon Development
Alexis London, Bayview Foundation



LAND USE SUMMARY TABLE	
ZONING	TR-U1
SITE AREA	280,402 SF
SITE VEHICULAR PAVE (EXCL. PERVIOUS)	10,432 SF
USABLE OPEN SPACE	185,178 SF
BUILDING FOOTPRINTS, AGGREGATE	85,292 SF
LOT COVERAGE	34.6%
RESIDENTIAL UNITS	130
EXTERIOR BIKE STALLS (WITHIN 100FT OF A PRIMARY ENTRY)	84
INTERIOR BIKE STORAGE	84
VEHICLE PARKING STALLS, SURFACE	52
VEHICLE PARKING STALLS, STRUCTURED	78

1 USABLE OPEN SPACE DIAGRAM
SCALE: 1" = 200'

601 Bay View Street Tree Inventory and Removals

Location/ Street Frontag	Species	Status	Approx. Size (DBH)	Reason for Removal
W. Washington Ave.				
	Acer platanus	remove	12"	conflict with new driveway/curb cut
	Acer platanus	remove	8"	conflict with new city street pavement/earthwork
	Acer platanus	remove	16"	conflict with new city street pavement/earthwork
Braxton Pl.				
	Acer platanus	remove	16"	conflict with new city street intersection pavement/earthwork
	Celtix occidentalis	remove	2"	conflict with new city street intersection pavement/earthwork

SHEET NOTES

A. CONTRACTOR SHALL OBTAIN 'EXCAVATE IN THE RIGHT-OF-WAY' PERMIT FROM THE CITY PRIOR TO COMMENCING WORK.

B. PRIOR TO INSTALLATION, CONTACT CITY OF MADISON FORESTRY TO COORDINATE CONSTRUCTION OBSERVATION.

C. CONTRACTOR SHALL CONTACT CITY FORESTRY BRAD HOFMANN BHOFMANN@CITYOFMADISON.COM OR 266-4816 AT LEAST ONE WEEK PRIOR TO PLANTING STREET TREES TO SCHEDULE INSPECTING THE NURSERY STOCK AND REVIEW PLANTING SPECIFICATIONS WITH THE LANDSCAPER. SEE LP001 FOR PLANT SCHEDULE.

D. ALL PROPOSED STREET TREE REMOVALS WITHIN THE RIGHT OF WAY SHALL BE REVIEWED BY CITY FORESTRY BEFORE THE PLAN COMMISSION MEETING. STREET TREE REMOVALS REQUIRE APPROVAL AND A TREE REMOVAL PERMIT ISSUED BY CITY FORESTRY. ANY STREET TREE REMOVALS REQUESTED AFTER THE DEVELOPMENT PLAN IS APPROVED BY THE PLAN COMMISSION OR THE BOARD OF PUBLIC WORKS AND CITY FORESTRY WILL REQUIRE A MINIMUM OF A 72-HOUR REVIEW PERIOD WHICH SHALL INCLUDE THE NOTIFICATION OF THE ALDERPERSON WITHIN WHO'S DISTRICT IS AFFECTED BY THE STREET TREE REMOVAL(S) PRIOR TO A TREE REMOVAL PERMIT BEING ISSUED.

E. AS DEFINED BY THE SECTION 107.13 OF CITY OF MADISON STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION: NO EXCAVATION IS PERMITTED WITHIN 5 FEET OF THE TRUNK OF THE STREET TREE OR WHEN CUTTING ROOTS OVER 3 INCHES IN DIAMETER. IF EXCAVATION IS NECESSARY, THE CONTRACTOR SHALL CONTACT MADISON CITY FORESTRY (266-4816) PRIOR TO EXCAVATION. CITY OF MADISON FORESTRY PERSONNEL SHALL ASSESS THE IMPACT TO THE TREE AND TO ITS ROOT SYSTEM PRIOR TO WORK COMMENCING. TREE PROTECTION SPECIFICATIONS CAN BE FOUND ON THE FOLLOWING WEBSITE: HTTPS://WWW.CITYOFMADISON.COM/BUSINESS/PW/SPECS.CFM

F. CONTRACTOR SHALL TAKE PRECAUTIONS DURING CONSTRUCTION TO NOT DISFIGURE, SCAR, OR IMPAIR THE HEALTH OF ANY STREET TREE. CONTRACTOR SHALL OPERATE EQUIPMENT IN A MANNER AS TO NOT DAMAGE THE BRANCHES OF THE STREET TREE(S). THIS MAY REQUIRE USING SMALLER EQUIPMENT AND LOADING AND UNLOADING MATERIALS IN A DESIGNATED SPACE AWAY FROM TREES ON THE CONSTRUCTION SITE. ANY DAMAGE OR INJURY TO EXISTING STREET TREES (EITHER ABOVE OR BELOW GROUND) SHALL BE REPORTED IMMEDIATELY TO CITY FORESTRY AT 266-4816. PENALTIES AND REMEDIATION SHALL BE REQUIRED.

G. SECTION 107.13(G) OF CITY OF MADISON STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION ADDRESSES SOIL COMPACTION NEAR STREET TREES AND SHALL BE FOLLOWED BY CONTRACTOR. THE STORAGE OF PARKED VEHICLES, CONSTRUCTION EQUIPMENT, BUILDING MATERIALS, REFUSE, EXCAVATED SPOILS OR DUMPING OF POISONOUS MATERIALS ON OR AROUND TREES AND ROOTS WITHIN FIVE (5) FEET OF THE TREE OR WITHIN THE PROTECTION ZONE IS PROHIBITED.

H. ON THIS PROJECT, STREET TREE PROTECTION ZONE FENCING IS REQUIRED. THE FENCING SHALL BE ERECTED BEFORE THE DEMOLITION, GRADING OR CONSTRUCTION BEGINS. THE FENCE SHALL INCLUDE THE ENTIRE WIDTH OF TERRACE AND, EXTEND AT LEAST 5 FEET ON BOTH SIDES OF THE OUTSIDE EDGE OF THE TREE TRUNK. DO NOT REMOVE THE FENCING TO ALLOW FOR DELIVERIES OR EQUIPMENT ACCESS THROUGH THE TREE PROTECTION ZONE.

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K. SEE ARCHITECTURAL PLANS FOR DRIVEWAY CROSS-SECTIONS AND SLOPES.

LEGEND

- PROPERTY BOUNDARY
- ASPHALT PAVEMENT
- HEAVY DUTY CONCRETE PAVEMENT
- CONCRETE PAVEMENT
- PERMEABLE PAVERS
- PLAY SURFACING
- AGGREGATE PATH
- STANDARD CURB AND GUTTER
- CURB TRANSITION
- FLUSH CURB AND GUTTER
- CURB RAMP
- CONTROL JOINT
- ISOLATION (EXPANSION) JOINT
- SITE WALL
- LIGHT POLE
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ISSUED FOR	REV	DATE
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DESIGN DEVELOPMENT SET		*10/02/2020*
CITY RESUBMITTAL		*10/05/2020*
		01/29/2021

SEALS AND SIGNATURES

NOT FOR CONSTRUCTION

KEY PLAN

PROJECT NORTH

DRAWING TITLE
OVERALL SITE PLAN

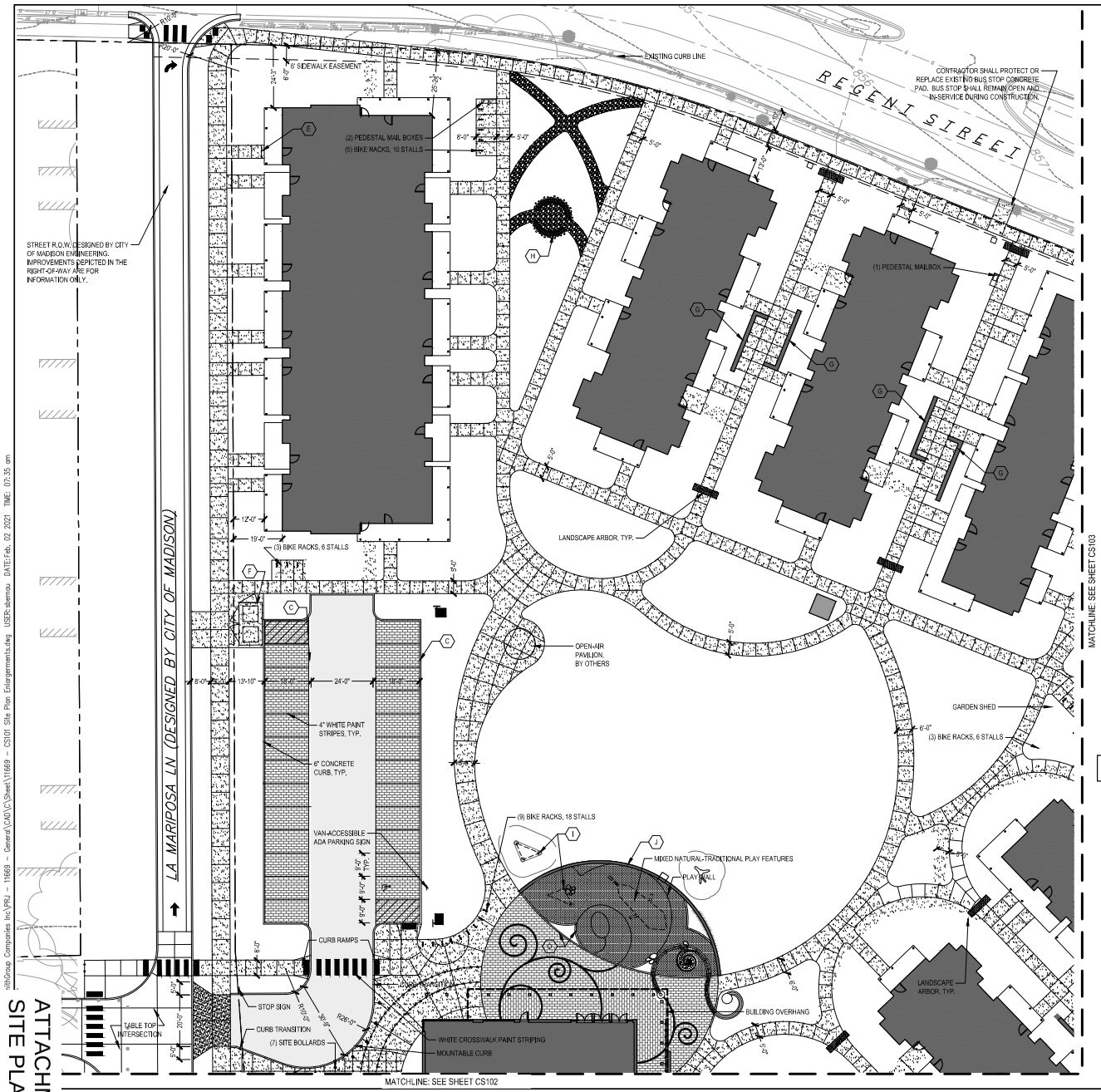
0' 20' 40' 80'
SCALE: 1"=40'

SCALE
11669.000

PROJECT NUMBER
CS100

DRAWING NUMBER

ATTACHMENT 1-
SITE PLAN



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KEYED NOTES

A	STANDARD CURB	4 / CS500
B	REJECT CURB	5 / CS500
C	FLUSH CURB	6 / CS500
D	LANDSCAPE CURB	7 / CS500
E	EXTERIOR STAIRS AND HANDRAIL	1 / CS503
F	TRASH ENCLOSURE	3 / CS504
G	COURTYARD SEAT WALL	2 / CS502
H	CIRCULAR SEAT WALL	1 / CS502
I	ROBINIA POLE	8 / CS501
J	SLOPED CONCRETE WALL	4 / CS505
K	WIRE MESH FENCE	1 / CS504
L	BOULDER RETAINING WALL	1 / CS506
M	ACCENT BOULDER	2 / CS505

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SEALS AND SIGNATURES

NOT FOR CONSTRUCTION

KEY PLAN

PROJECT NORTH

DRAWING TITLE
SITE PLAN ENLARGEMENT

SCALE: 1"=20'

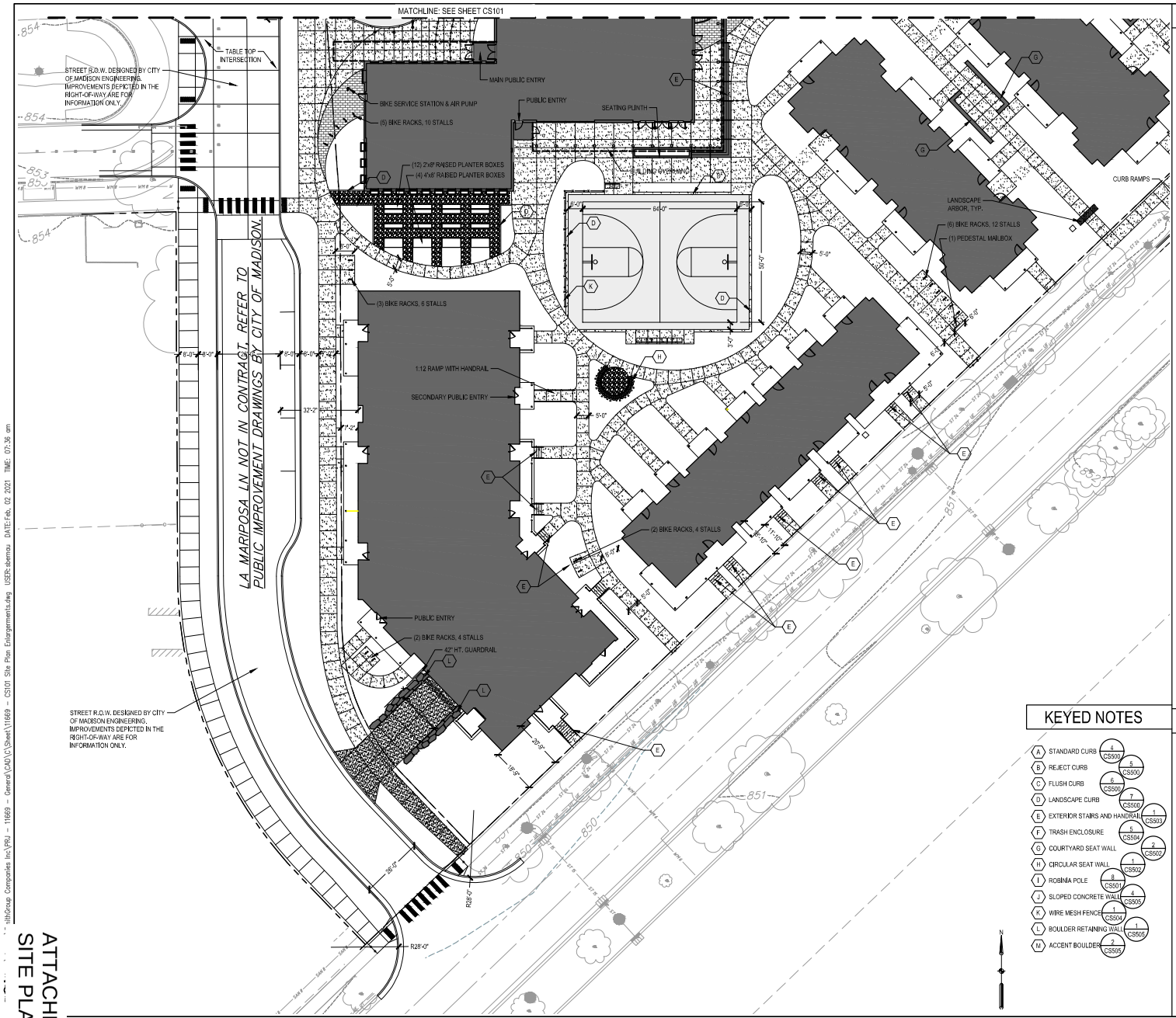
SCALE
11669.000

PROJECT NUMBER

CS101

DRAWING NUMBER

ATTACHMENT 1-
SITE PLAN



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SEALS AND SIGNATURES

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KEY PLAN

PROJECT NORTH

DRAWING TITLE
SITE PLAN ENLARGEMENT

SCALE: 1"=20'

SCALE
11669.000

PROJECT NUMBER

CS102

DRAWING NUMBER

ATTACHMENT 1-
SITE PLAN

ATTACHMENT 2 - PERMEABLE PAVEMENT ANALYSIS

Bayview - Green Infrastructure Design
Permeable Pavers
Compare As-Designed with Regulatory Requirement:

1 Regulatory TSS Reduction Requirement

Driving/Parking Areas:

Location	Area (sf)	
West Parking Lot	9,801	
East Parking Lot	9,614	
South Ramp Entrance:	600	
Total	20,015	sf
	0.46	Ac

Per Baseline WinSLAMM Model:
TSS Loading: 283 lbs/YR

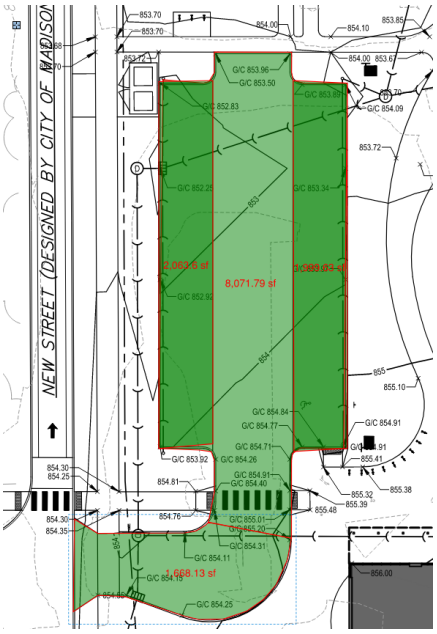
Required Reduction 169.8 lbs. (Based on 60% Reduction)

2 As Designed:

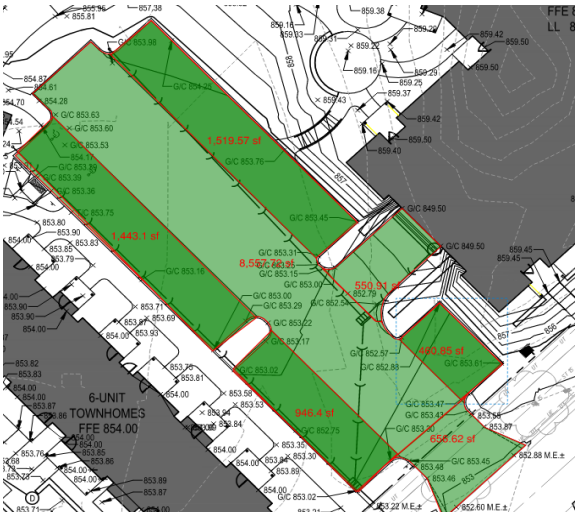
Provide 8,404 sq. feet of permeable pavers (parking bays).
Breakdown of lot/driveway areas to permeable pavers:
Area Breakdown

Location	Drained To PP (sf)	Not Drained to PP (sf)	Total (sf)	
West	8,133	1,668	9,801	
East	8,407	1,207	9,614	
South Ramp		600	600	
	16,540	3,475	20,015	SF
	0.38	0.08	0.46	Ac

West



East



3 Reductions Achieved:

Per WinSLAMM Modeling, Proposed configuration provides 73% TSS Reduction (exceeds 60% requirement):
(Captures 207 lbs of TSS > 170 lb requirement).

Data file name: C:\Users\dwolmutt\SmithGroup Companies Inc\PRJ - 11669 - General\ADMIN\Disciplines\Civil\Stormwater\WinSLAMM\Bayview_Prop_Parkg and Road
WinSLAMM Version 10.4.1
Rain file name: C:\WinSLAMM Files\Rain Files\WI_Multi_rain\Madison\WisReg - Madison WI Annual 1981.ran
Particulate Solids Concentration file name: C:\WinSLAMM Files\v10.1 WI_AVG01.pscx
Runoff Coefficient file name: C:\WinSLAMM Files\WI_SL06 Dec06.rsvx
Residential Street Delivery file name: C:\WinSLAMM Files\WI_Res and Other Urban Dec06.std
Institutional Street Delivery file name: C:\WinSLAMM Files\WI_Com Inst Indust Dec06.std
Commercial Street Delivery file name: C:\WinSLAMM Files\WI_Com Inst Indust Dec06.std
Industrial Street Delivery file name: C:\WinSLAMM Files\WI_Com Inst Indust Dec06.std
Other Urban Street Delivery file name: C:\WinSLAMM Files\WI_Res and Other Urban Dec06.std
Freeway Street Delivery file name: C:\WinSLAMM Files\Freeway Dec06.std
Apply Street Delivery Files to Adjust the After Event Load Street Dirt Mass Balance: False
Pollutant Relative Concentration file name: C:\WinSLAMM Files\WI_GEO03.ppdx
Source Area PSD and Peak to Average Flow Ratio File: C:\WinSLAMM Files\NURP Source Area PSD Files.csv
Cost Data file name:
Seed for random number generator: -42
Study period starting date: 01/01/81 Study period ending date: 12/31/81
Start of Winter Season: 12/02 End of Winter Season: 03/12
Date: 02-02-2021 Time: 14:07:57
Site information:

LU# 1 - Residential: Residential 1 Total area (ac): 0.460
13 - Paved Parking 1: 0.380 ac. Connected PSD File: C:\WinSLAMM Files\NURP.cpz PP-CP#1
14 - Paved Parking 2: 0.080 ac. Connected PSD File: C:\WinSLAMM Files\NURP.cpz

Control Practice 1: Porous Pavement CP# 1 (SA) - SA Device, LU# 1 ,SA# 13
Porous pavement area (ac): 0.198
Inflow hydrograph peak to average flow ratio: 3.8
Porous pavement thickness (in): 4
Porous pavement porosity: 0.2
Aggregate bedding thickness (in): 5
Aggregate bedding porosity: 0.3
Aggregate base reservoir thickness (in): 12
Aggregate base reservoir porosity: 0.3
Underdrain diameter (in): 4
Underdrain outlet invert elevation (inches above datum): 0
Number of underdrains: 1
Subgrade seepage rate (in/hr): 0.3
Use random number generation to account for uncertainty in seepage rate: 0
Subgrade seepage rate COV: 0
Surface pavement initial infiltration rate (in/hr): 100
Surface pavement initial infiltration rate (in/hr): 100
Surface Pavement Percent Solids Removal Upon Cleaning: 50
Porous pavement surface clogging load (lbs/sf): 0.06
Porous pavement restorative cleaning frequency: Semi-annually
TSS concentration reduction percentage through underdrain: 65
Porous pavement particle size distribution file name: Not needed - calculated by program

SLAMM for Windows Version 10.4.1

Data file name: C:\Users\dwolmutt\SmithGroup Companies Inc\PRJ - 11669 - General\ADMIN\Disciplines\Civil\Stormwater\WinSLAMM\Bayview_Prop_Parkg and Road
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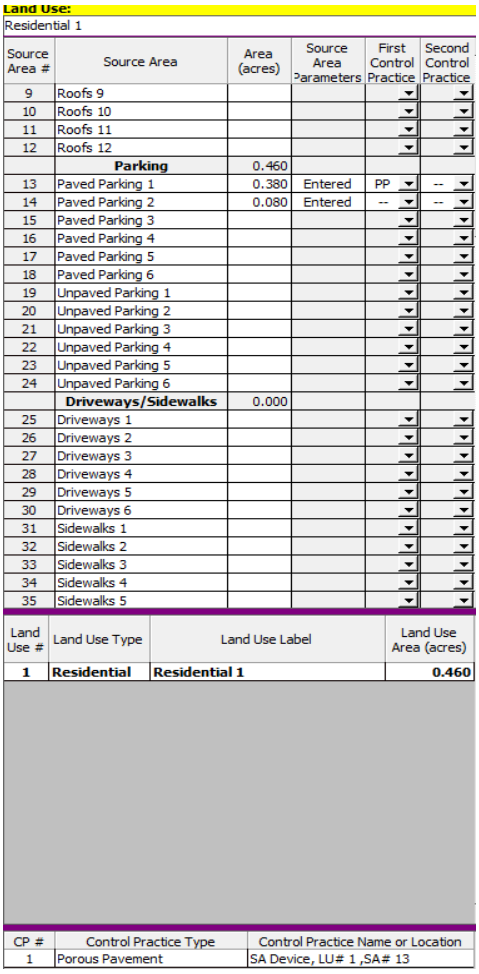
Freeway Street Delivery file name: C:\WinSLAMM Files\Freeway Dec06.std
Apply Street Delivery Files to Adjust the After Event Load Street Dirt Mass Balance: False
Source Area PSD and Peak to Average Flow Ratio File: C:\WinSLAMM Files\NURP Source Area PSD Files.csv
Cost Data file name:
Seed for random number generator: -42
Study period starting date: 01/01/81 Study period ending date: 12/31/81
Start of Winter Season: 12/02 End of Winter Season: 03/12
Model Run Start Date: 01/01/81 Model Run End Date: 12/31/81
Date of run: 02-02-2021 Time of run: 14:07:16
Total Area Modeled (acres): 0.460
Years in Model Run: 1.00

	Runoff Volume (cu ft)	Percent Runoff Volume Reduction	Particulate Solids Conc. (mg/L)	Particulate Solids Yield (lbs)	Percent Particulate Solids Reduction
Total of all Land Uses without Controls:	34917	-	130.0	283.4	-
Outfall Total with Controls:	16431	52.94%	74.22	76.12	73.14%
Annualized Total After Outfall Controls:	16476			76.33	

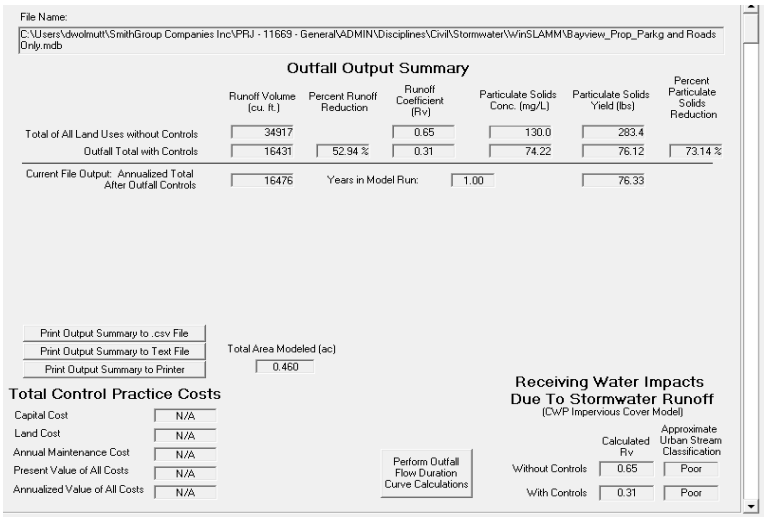


Land Use:
Residential 1

Source Area #	Source Area	Area (acres)	Source Area Parameters	First Control Practice	Second Control Practice
9	Roofs 9				
10	Roofs 10				
11	Roofs 11				
12	Roofs 12				
	Parking	0.460			
13	Paved Parking 1	0.380	Entered	PP	--
14	Paved Parking 2	0.080	Entered	--	--
15	Paved Parking 3				
16	Paved Parking 4				
17	Paved Parking 5				
18	Paved Parking 6				
19	Unpaved Parking 1				
20	Unpaved Parking 2				
21	Unpaved Parking 3				
22	Unpaved Parking 4				
23	Unpaved Parking 5				
24	Unpaved Parking 6				
	Driveways/Sidewalks	0.000			
25	Driveways 1				
26	Driveways 2				
27	Driveways 3				
28	Driveways 4				
29	Driveways 5				
30	Driveways 6				
31	Sidewalks 1				
32	Sidewalks 2				
33	Sidewalks 3				
34	Sidewalks 4				
35	Sidewalks 5				

Land Use #	Land Use Type	Land Use Label	Land Use Area (acres)
1	**Residential**	**Residential 1**	**0.460**

CP #	Control Practice Type	Control Practice Name or Location
1	Porous Pavement	SA Device, LU# 1 ,SA# 13



File Name:
C:\Users\dwolmutt\SmithGroup Companies Inc\PRJ - 11669 - General\ADMIN\Disciplines\Civil\Stormwater\WinSLAMM\Bayview_Prop_Parkg and Roads Only.mdb

Outfall Output Summary

	Runoff Volume (cu. ft.)	Percent Runoff Reduction	Runoff Coefficient (Rv)	Particulate Solids Conc. (mg/L)	Particulate Solids Yield (lbs)	Percent Particulate Solids Reduction
Total of All Land Uses without Controls	34917		0.65	130.0	283.4	
Outfall Total with Controls	16431	52.94 %	0.31	74.22	76.12	73.14 %
Current File Output: Annualized Total After Outfall Controls	16476	Years in Model Run:	1.00		76.33	

Print Output Summary to .csv File
Print Output Summary to Text File
Print Output Summary to Printer

Total Area Modeled (ac): 0.460

Total Control Practice Costs

Capital Cost	N/A
Land Cost	N/A
Annual Maintenance Cost	N/A
Present Value of All Costs	N/A
Annualized Value of All Costs	N/A

Perform Outfall Flow Duration Curve Calculations

Receiving Water Impacts Due To Stormwater Runoff
(CWP Impervious Cover Model)

	Calculated Rv	Approximate Urban Stream Classification
Without Controls	0.65	Poor
With Controls	0.31	Poor

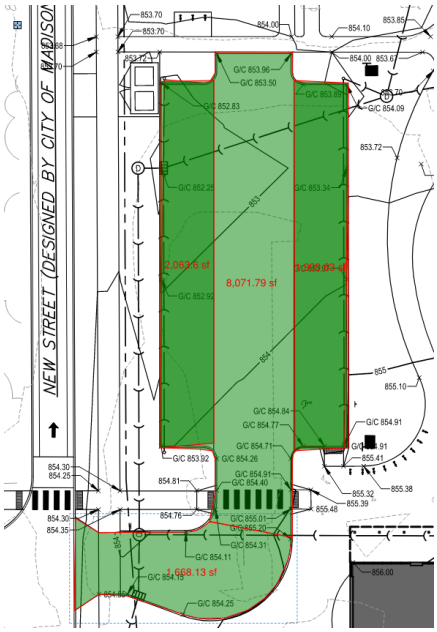
3 Minimum Paver Area Needed to comply with Madison requirements:

Convert NE parking bays from permeable pavers (per current design) to asphalt.
Reduce permeable paver area from 8,404 sf to 6,708 sf.

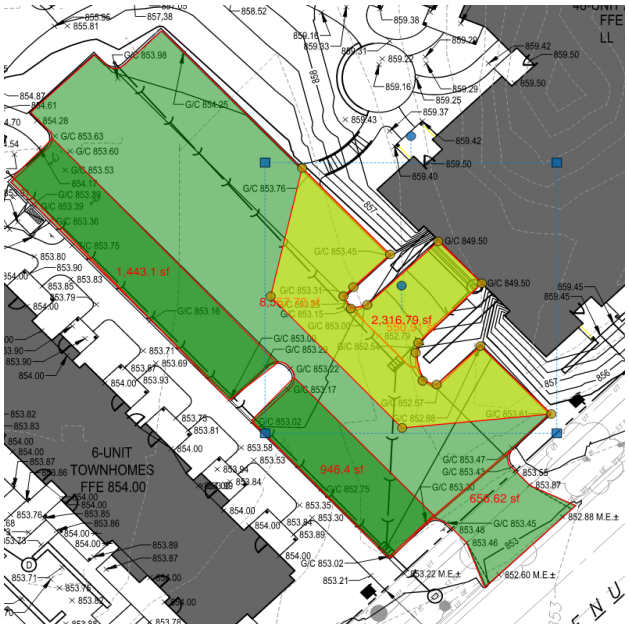
Updated paver tributary breakdown:

Location	Drained To PP (sf)	Not Drained to PP (sf)	Total (sf)	
West	8,133	1,668	9,801	
East	6,643	2,971	9,614	
South Ramp		600	600	
	14,776	5,239	20,015	SF
	0.34	0.12	0.46	Ac

West



East



Results:

Residential 1

Source Area #	Source Area	Area (acres)	Source Area Parameters	First Control Practice	Second Control Practice
	Roofs	0.000			
1	Roofs 1				
2	Roofs 2				
3	Roofs 3				
4	Roofs 4				
5	Roofs 5				
6	Roofs 6				
7	Roofs 7				
8	Roofs 8				
9	Roofs 9				
10	Roofs 10				
11	Roofs 11				
12	Roofs 12				
	Parking	0.460			
13	Paved Parking 1	0.340	Entered	PP	--
14	Paved Parking 2	0.120	Entered	--	--
15	Paved Parking 3				
16	Paved Parking 4				
17	Paved Parking 5				
18	Paved Parking 6				
19	Unpaved Parking 1				
20	Unpaved Parking 2				
21	Unpaved Parking 3				
22	Unpaved Parking 4				
23	Unpaved Parking 5				
24	Unpaved Parking 6				
	Driveways/Sidewalks	0.000			
25	Driveways 1				
26	Driveways 2				

Land Use #	Land Use Type	Land Use Label	Land Use Area (acres)
1	Residential	Residential 1	0.460

CP #	Control Practice Type	Control Practice Name or Location
1	Porous Pavement	SA Device. LU# 1 .SA# 13

File Name:
C:\Users\dwolmutt\SmithGroup Companies Inc\PRJ - 11669 - General\ADMIN\Disciplines\Civil\Dane County Grant - Sustainability\WinSLAMM Files\Area to Meet City Min.mdb

Outfall Output Summary

	Runoff Volume (cu. ft.)	Percent Runoff Reduction	Runoff Coefficient (Rv)	Particulate Solids Conc. (mg/L)	Particulate Solids Yield (lbs)	Percent Particulate Solids Reduction
Total of All Land Uses without Controls	34917		0.65	130.0	283.4	
Outfall Total with Controls	19801	43.29 %	0.37	82.23	101.6	64.15 %
Current File Output: Annualized Total After Outfall Controls	19855	Years in Model Run:	1.00		101.9	

Print Output Summary to .csv File
Print Output Summary to Text File
Print Output Summary to Printer

Total Area Modeled (ac): 0.460

Total Control Practice Costs

Capital Cost	N/A
Land Cost	N/A
Annual Maintenance Cost	N/A
Present Value of All Costs	N/A
Annualized Value of All Costs	N/A

Perform Outfall Flow Duration Curve Calculations

Receiving Water Impacts Due To Stormwater Runoff
(CWP Impervious Cover Model)

	Calculated Rv	Approximate Urban Stream Classification
Without Controls	0.65	Poor
With Controls	0.37	Poor

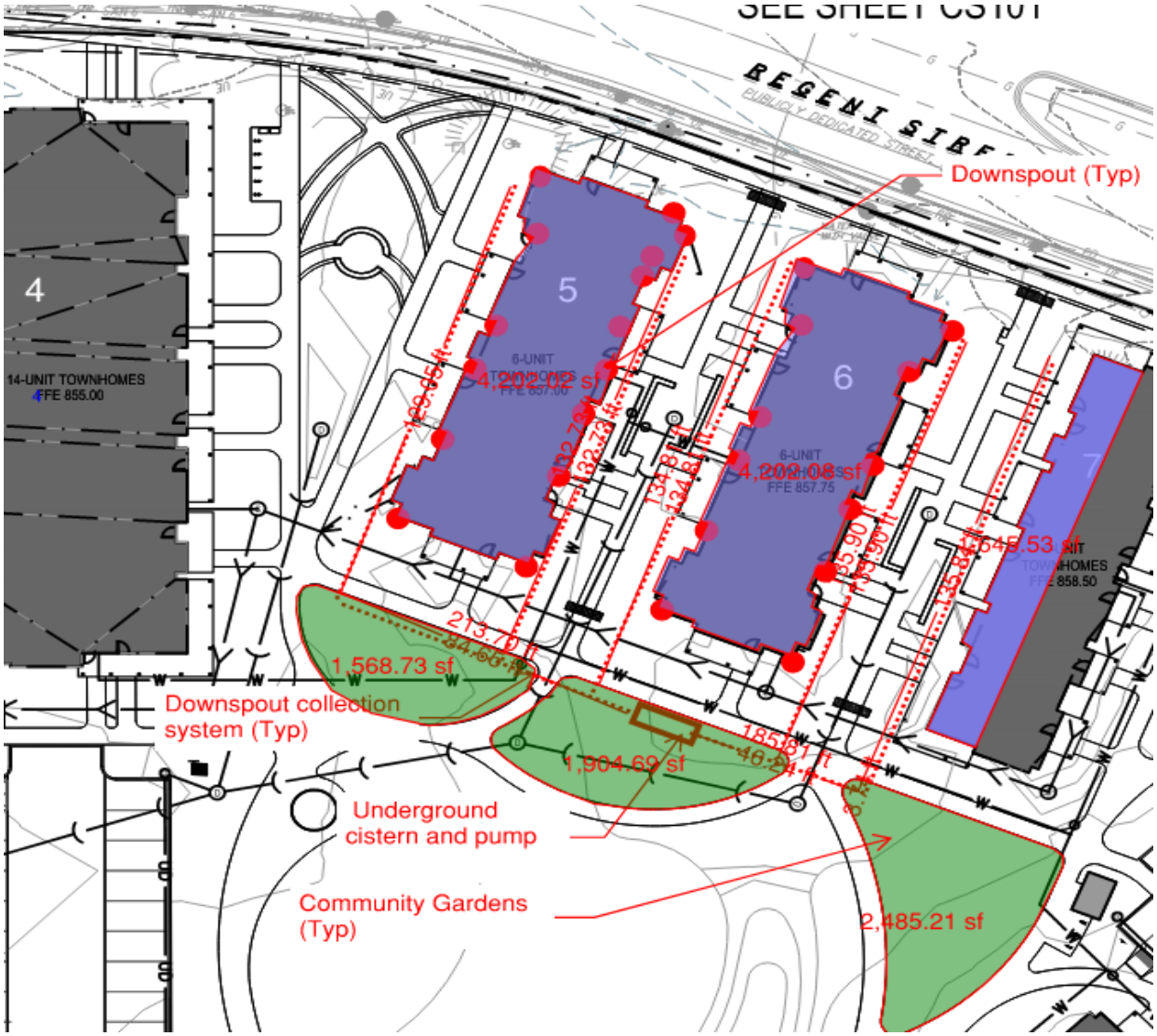
Comparison:

	Paver Area (sf)	TSS Captured (lb)	Volume Reduction (cf)	Gallons
Provided	8,404	207	18,924	141,552
Required	6,747	170	15,163	113,419
Difference	1,657	37	3,761	28,132

Conclusion: Pavers in the north parking bay of the east lot are not necessary for regulatory compliance but provide approximately 37 additional lbs of TSS removal and 28,000 gallons of additional volume reduction annually.

ATTACHMENT 3 - CISTERN/IRRIGATION CALCS

Bayview - Green Infrastructure Design
Runoff Capture - Irrigation System
North Cistern and Community Gardens



Bayview - Green Infrastructure Design
Runoff Capture - Irrigation System
North Cistern and Community Gardens

Assumed Stora	15,000	gal
Assumed Usag	1,500	gal/day

Event Date	Rainfall (in)	Influent Runoff Vol (cf)	Influent Runoff Vol (Gal)	Starting Storage (gal)	Storage at end of Event (gal)	Overflow (Gal)	Days Between Events	Demand Between Events (gpd)	Storage at start of next event (gal)
								OUTSIDE GROWING SEASON	0
3/25/1981	0.07	31.89	239	0.0	239	0			
							4		239
3/29/1981	0.05	14.72	110	238.5	349	0			
							0		349
3/29/1981	0.06	22.5	168	348.6	517	0			
							0		517
3/29/1981	0.07	31.89	239	516.9	755	0			
							5		755
4/3/1981	0.02	2.121	16	755.5	771	0			
							0		771
4/3/1981	0.26	190.1	1,422	771.3	2,193	0			
							4		2,193
4/7/1981	0.71	566.7	4,239	2193.3	6,432	0			
							1		6,432
4/8/1981	0.41	318.9	2,385	6432.2	8,818	0			
							2		8,818
4/10/1981	1.06	861.8	6,446	8817.6	15,000	264			
							2		15,000
4/12/1981	0.13	83.04	621	15000.0	15,000	621			
							1		15,000
4/13/1981	0.32	240.5	1,799	15000.0	15,000	1,799			
							3		15,000
4/16/1981	0.01	0.5302	4	15000.0	15,000	4			
							3		15,000
4/19/1981	0.04	8.552	64	15000.0	15,000	64			
							3		15,000
4/22/1981	0.01	0.5302	4	15000.0	15,000	4			
							0		15,000
4/22/1981	0.02	2.121	16	15000.0	15,000	16			
							1		15,000
4/23/1981	0.05	14.72	110	15000.0	15,000	110			
							5		15,000
4/28/1981	0.3	223.4	1,671	15000.0	15,000	1,671			
							0		15,000
4/28/1981	0.06	22.5	168	15000.0	15,000	168			
							2		15,000
4/30/1981	0.02	2.121	16	15000.0	15,000	16			
							4		15,000
5/4/1981	0.09	49.92	373	15000.0	15,000	373			
							6		15,000
5/10/1981	0.08	42.34	317	15000.0	15,000	317			
							3		15,000

5/13/1981	0.01	0.5302	4	15000.0	15,000	4			
							10		15,000
5/23/1981	0.02	2.121	16	15000.0	15,000	16			
							1		15,000
5/24/1981	0.1	58.01	434	15000.0	15,000	434			
							5		15,000
5/29/1981	0.34	257.8	1,928	15000.0	15,000	1,928			
							4	6,000	9,000
6/2/1981	0.01	0.5302	4	9000.0	9,004	0			
							1	1,500	7,504
6/3/1981	0.01	0.5302	4	7504.0	7,508	0			
							5	7,500	8
6/8/1981	0.01	0.5302	4	7.9	12	0			
							0	0	12
6/8/1981	0.33	249.1	1,863	11.9	1,875	0			
							1	1,500	375
6/9/1981	0.07	31.89	239	375.2	614	0			
							3	4,500	0
6/12/1981	0.43	335.2	2,507	0.0	2,507	0			
							3	4,500	0
6/15/1981	2.59	2141	16,015	0.0	15,000	1,015			
							5	7,500	7,500
6/20/1981	0.34	257.8	1,928	7500.0	9,428	0			
							1	1,500	7,928
6/21/1981	0.32	240.5	1,799	7928.3	9,727	0			
							2	3,000	6,727
6/23/1981	0.51	401	2,999	6727.3	9,727	0			
							2	3,000	6,727
6/25/1981	0.13	83.04	621	6726.8	7,348	0			
							3	4,500	2,848
6/28/1981	0.24	173.8	1,300	2847.9	4,148	0			
							6	9,000	0
7/4/1981	0.05	14.72	110	0.0	110	0			
							7	10,500	0
7/11/1981	0.5	392.7	2,937	0.0	2,937	0			
							1	1,500	1,437
7/12/1981	0.14	90.91	680	1437.4	2,117	0			
							0	0	2,117
7/12/1981	0.86	691.9	5,175	2117.4	7,293	0			
							1	1,500	5,793
7/13/1981	1.32	1080	8,078	5792.8	13,871	0			
							1	1,500	12,371
7/14/1981	0.12	75.38	564	12371.2	12,935	0			
							1	1,500	11,435
7/15/1981	0.07	31.89	239	11435.1	11,674	0			
							3	4,500	7,174
7/18/1981	0.12	75.38	564	7173.6	7,737	0			
							2	3,000	4,737

7/20/1981	0.54	426	3,186	4737.4	7,924	0			
							0	0	7,924
7/20/1981	0.1	58.01	434	7923.9	8,358	0			
							3	4,500	3,858
7/23/1981	0.09	49.92	373	3857.8	4,231	0			
							2	3,000	1,231
7/25/1981	0.24	173.8	1,300	1231.2	2,531	0			
							2	3,000	0
7/27/1981	0.66	525.4	3,930	0.0	3,930	0			
							6	9,000	0
8/2/1981	0.58	459.5	3,437	0.0	3,437	0			
							1	1,500	1,937
8/3/1981	0.04	8.552	64	1937.1	2,001	0			
							2	3,000	0
8/5/1981	0.01	0.5302	4	0.0	4	0			
							2	3,000	0
8/7/1981	0.02	2.121	16	0.0	16	0			
							7	10,500	0
8/14/1981	2.09	1727	12,918	0.0	12,918	0			
							12	18,000	0
8/26/1981	0.49	384.5	2,876	0.0	2,876	0			
							0	0	2,876
8/26/1981	1.63	1336	9,993	2876.1	12,869	0			
							2	3,000	9,869
8/28/1981	0.62	492.5	3,684	9869.3	13,553	0			
							0	0	13,553
8/28/1981	0.04	8.552	64	13553.2	13,617	0			
							3	4,500	9,117
8/31/1981	0.03	4.771	36	9117.2	9,153	0			
							0	0	9,153
8/31/1981	1.52	1244	9,305	9152.9	15,000	3,458			
							7	10,500	4,500
9/7/1981	0.89	717.2	5,365	4500.0	9,865	0			
							4	6,000	3,865
9/11/1981	0.08	42.34	317	3864.7	4,181	0			
							5	7,500	0
9/16/1981	0.03	4.771	36	0.0	36	0			
							5	7,500	0
9/21/1981	0.45	351.6	2,630	0.0	2,630	0			
							3	4,500	0
9/24/1981	0.9	725.7	5,428	0.0	5,428	0			
							2	3,000	2,428
9/26/1981	0.12	75.38	564	2428.2	2,992	0			
							2	3,000	0
9/28/1981	0.1	58.01	434	0.0	434	0			
							1	1,500	0
9/29/1981	0.16	107.3	803	0.0	803	0			
							1	1,500	0

9/30/1981	0.36	275.4	2,060	0.0	2,060	0			
							1	1,500	560
10/1/1981	0.01	0.5302	4	560.0	564	0			
							3	4,500	0
10/4/1981	0.15	99	741	0.0	741	0			
							1	1,500	0
10/5/1981	0.04	8.552	64	0.0	64	0			
							0	0	64
10/5/1981	0.02	2.121	16	64.0	80	0			
							4	6,000	0
10/9/1981	0.14	90.91	680	0.0	680	0			
							4	6,000	0
10/13/1981	1.2	981.8	7,344	0.0	7,344	0			
							2	3,000	4,344
10/15/1981	0.02	2.121	16	4343.9	4,360	0			
							2		4,360
10/17/1981	0.95	768	5,745	4359.7	10,104	0			
							1		10,104
10/18/1981	0.06	22.5	168	10104.4	10,273	0			
							3		10,273
10/21/1981	0.06	22.5	168	10272.7	10,441	0			
							0		10,441
10/21/1981	0.01	0.5302	4	10441.0	10,445	0			
							3		10,445
10/24/1981	0.01	0.5302	4	10444.9	10,449	0			
							7		10,449
10/31/1981	0.01	0.5302	4	10448.9	10,453	0			
							5		10,453
11/5/1981	0.04	8.552	64	10452.9	10,517	0			
							10		10,517
11/15/1981	0.07	31.89	239	10516.8	10,755	0			
							3		10,755
11/18/1981	0.05	14.72	110	10755.4	10,865	0			
							1		10,865
11/19/1981	0.26	190.1	1,422	10865.5	12,287	0			
							4		12,287
11/23/1981	0.18	124.5	931	12287.4	13,219	0			
							2		13,219
11/25/1981	0.89	717.2	5,365	13218.7	15,000	3,583			
							5		15,000
11/30/1981	0.37	284.3	2,127	15000.0	15,000	2,127			
							3		15,000
12/3/1981	-	0	0	15000.0	15,000	0			
							11		15,000
12/14/1981	-	0	0	15000.0	15,000	0			
							6		15,000
12/20/1981	-	0	0	15000.0	15,000	0			
							6		15,000

12/26/1981	-	0	0	15000.0	15,000	0			
							5		15,000
12/31/1981	-	0	0	15000.0	15,000	0			
Total			164,911			17,992			

%Captured 89.1%

Notes

1 Assume no demand prior to June 1

134,579

Bayview - Green Infrastructure Design
Runoff Capture - Irrigation System
South Cistern and Community Gardens

Assumed Storage: 15,000 gal
Assumed Usage 1,500 gal/day

Event Date	Rainfall (in)	Influent Runoff Vol (cf)	Influent Runoff Vol (Gal)	Starting Storage (gal)	Storage at end of Event (gal)	Overflow (Gal)	Days Between Events	Demand Between Events (gpd)	Storage at start of next event (gal)
								OUTSIDE GROWING SEASON	0
3/25/1981	0.07	24.26	181	0.0	181	0			
							4		181
3/29/1981	0.05	11.2	84	181.5	265	0			
							0		265
3/29/1981	0.06	17.12	128	265.2	393	0			
							0		393
3/29/1981	0.07	24.26	181	393.3	575	0			
							5		575
4/3/1981	0.02	1.614	12	574.8	587	0			
							0		587
4/3/1981	0.26	144.6	1,082	586.8	1,668	0			
							4		1,668
4/7/1981	0.71	431.2	3,225	1668.4	4,894	0			
							1		4,894
4/8/1981	0.41	242.7	1,815	4893.8	6,709	0			
							2		6,709
4/10/1981	1.06	655.8	4,905	6709.2	11,615	0			
							2		11,615
4/12/1981	0.13	63.18	473	11614.6	12,087	0			
							1		12,087
4/13/1981	0.32	183	1,369	12087.2	13,456	0			
							3		13,456
4/16/1981	0.01	0.4034	3	13456.0	13,459	0			
							3		13,459
4/19/1981	0.04	6.507	49	13459.0	13,508	0			
							3		13,508
4/22/1981	0.01	0.4034	3	13507.7	13,511	0			
							0		13,511
4/22/1981	0.02	1.614	12	13510.7	13,523	0			
							1		13,523
4/23/1981	0.05	11.2	84	13522.8	13,607	0			
							5		13,607
4/28/1981	0.3	170	1,272	13606.6	14,878	0			
							0		14,878
4/28/1981	0.06	17.12	128	14878.2	15,000	6			
							2		15,000
4/30/1981	0.02	1.614	12	15000.0	15,000	12			
							4		15,000
5/4/1981	0.09	37.98	284	15000.0	15,000	284			
							6		15,000
5/10/1981	0.08	32.21	241	15000.0	15,000	241			
							3		15,000
5/13/1981	0.01	0.4034	3	15000.0	15,000	3			
							10		15,000
5/23/1981	0.02	1.614	12	15000.0	15,000	12			
							1		15,000

5/24/1981	0.1	44.14	330	15000.0	15,000	330			
							5		15,000
5/29/1981	0.34	196.2	1,468	15000.0	15,000	1,468			
							4	6,000	9,000
6/2/1981	0.01	0.4034	3	9000.0	9,003	0			
							1	1,500	7,503
6/3/1981	0.01	0.4034	3	7503.0	7,506	0			
							5	7,500	6
6/8/1981	0.01	0.4034	3	6.0	9	0			
							0	0	9
6/8/1981	0.33	189.5	1,417	9.1	1,427	0			
							1	1,500	0
6/9/1981	0.07	24.26	181	0.0	181	0			
							3	4,500	0
6/12/1981	0.43	255	1,907	0.0	1,907	0			
							3	4,500	0
6/15/1981	2.59	1629	12,185	0.0	12,185	0			
							5	7,500	4,685
6/20/1981	0.34	196.2	1,468	4684.9	6,152	0			
							1	1,500	4,652
6/21/1981	0.32	183	1,369	4652.5	6,021	0			
							2	3,000	3,021
6/23/1981	0.51	305.1	2,282	3021.3	5,303	0			
							2	3,000	2,303
6/25/1981	0.13	63.18	473	2303.5	2,776	0			
							3	4,500	0
6/28/1981	0.24	132.3	990	0.0	990	0			
							6	9,000	0
7/4/1981	0.05	11.2	84	0.0	84	0			
							7	10,500	0
7/11/1981	0.5	298.8	2,235	0.0	2,235	0			
							1	1,500	735
7/12/1981	0.14	69.17	517	735.0	1,252	0			
							0	0	1,252
7/12/1981	0.86	526.5	3,938	1252.4	5,191	0			
							1	1,500	3,691
7/13/1981	1.32	821.8	6,147	3690.6	9,838	0			
							1	1,500	8,338
7/14/1981	0.12	57.36	429	8337.7	8,767	0			
							1	1,500	7,267
7/15/1981	0.07	24.26	181	7266.8	7,448	0			
							3	4,500	2,948
7/18/1981	0.12	57.36	429	2948.2	3,377	0			
							2	3,000	377
7/20/1981	0.54	324.1	2,424	377.3	2,802	0			
							0	0	2,802
7/20/1981	0.1	44.14	330	2801.5	3,132	0			
							3	4,500	0
7/23/1981	0.09	37.98	284	0.0	284	0			
							2	3,000	0
7/25/1981	0.24	132.3	990	0.0	990	0			
							2	3,000	0
7/27/1981	0.66	399.8	2,991	0.0	2,991	0			
							6	9,000	0
8/2/1981	0.58	349.6	2,615	0.0	2,615	0			
							1	1,500	1,115
8/3/1981	0.04	6.507	49	1115.0	1,164	0			
							2	3,000	0
8/5/1981	0.01	0.4034	3	0.0	3	0			

							2	3,000	0
8/7/1981	0.02	1.614	12	0.0	12	0			
							7	10,500	0
8/14/1981	2.09	1314	9,829	0.0	9,829	0			
							12	18,000	0
8/26/1981	0.49	292.5	2,188	0.0	2,188	0			
							0	0	2,188
8/26/1981	1.63	1016	7,600	2187.9	9,788	0			
							2	3,000	6,788
8/28/1981	0.62	374.8	2,804	6787.6	9,591	0			
							0	0	9,591
8/28/1981	0.04	6.507	49	9591.1	9,640	0			
							3	4,500	5,140
8/31/1981	0.03	3.63	27	5139.8	5,167	0			
							0	0	5,167
8/31/1981	1.52	946.3	7,078	5166.9	12,245	0			
							7	10,500	1,745
9/7/1981	0.89	545.7	4,082	1745.2	5,827	0			
							4	6,000	0
9/11/1981	0.08	32.21	241	0.0	241	0			
							5	7,500	0
9/16/1981	0.03	3.63	27	0.0	27	0			
							5	7,500	0
9/21/1981	0.45	267.5	2,001	0.0	2,001	0			
							3	4,500	0
9/24/1981	0.9	552.1	4,130	0.0	4,130	0			
							2	3,000	1,130
9/26/1981	0.12	57.36	429	1129.7	1,559	0			
							2	3,000	0
9/28/1981	0.1	44.14	330	0.0	330	0			
							1	1,500	0
9/29/1981	0.16	81.64	611	0.0	611	0			
							1	1,500	0
9/30/1981	0.36	209.5	1,567	0.0	1,567	0			
							1	1,500	67
10/1/1981	0.01	0.4034	3	67.1	70	0			
							3	4,500	0
10/4/1981	0.15	75.32	563	0.0	563	0			
							1	1,500	0
10/5/1981	0.04	6.507	49	0.0	49	0			
							0	0	49
10/5/1981	0.02	1.614	12	48.7	61	0			
							4	6,000	0
10/9/1981	0.14	69.17	517	0.0	517	0			
							4	6,000	0
10/13/1981	1.2	747.1	5,588	0.0	5,588	0			
							2		5,588
10/15/1981	0.02	1.614	12	5588.3	5,600	0			
							2		5,600
10/17/1981	0.95	584.3	4,371	5600.4	9,971	0			
							1		9,971
10/18/1981	0.06	17.12	128	9970.9	10,099	0			
							3		10,099
10/21/1981	0.06	17.12	128	10099.0	10,227	0			
							0		10,227
10/21/1981	0.01	0.4034	3	10227.1	10,230	0			
							3		10,230
10/24/1981	0.01	0.4034	3	10230.1	10,233	0			
							7		10,233

10/31/1981	0.01	0.4034	3	10233.1	10,236	0			
							5		10,236
11/5/1981	0.04	6.507	49	10236.1	10,285	0			
							10		10,285
11/15/1981	0.07	24.26	181	10284.8	10,466	0			
							3		10,466
11/18/1981	0.05	11.2	84	10466.2	10,550	0			
							1		10,550
11/19/1981	0.26	144.6	1,082	10550.0	11,632	0			
							4		11,632
11/23/1981	0.18	94.75	709	11631.6	12,340	0			
							2		12,340
11/25/1981	0.89	545.7	4,082	12340.4	15,000	1,422			
							5		15,000
11/30/1981	0.37	216.3	1,618	15000.0	15,000	1,618			
							3		15,000
12/3/1981	-	0	0	15000.0	15,000	0			
							11		15,000
12/14/1981	-	0	0	15000.0	15,000	0			
							6		15,000
12/20/1981	-	0	0	15000.0	15,000	0			
							6		15,000
12/26/1981	-	0	0	15000.0	15,000	0			
							5		15,000
12/31/1981	-	0	0	15000.0	15,000	0			
Total			125,472			5,396			

%Captured 95.7%

Notes

1 Assume no demand prior to June 1

ATTACHMENT 4 - NATIVE PLANTING CALCULATIONS

Bayview - Green Infrastructure Design
Native Plantings Versus Traditional Turf

Native Planting Area: **37,407 sf**
Evaluate considering differences in soil compaction and vegetation type.
Existing soils - Colwood and Virgil Silt Loams - Poorly drained - Primarily Silt/Clay

1. Baseline analysis: Assume turf with standard post-construction compaction (i.e., bump HSG from C to D - CN=78).
2. Native Plantings Analysis: Assume meadow with HSG B (CN=58)

1 Annualize runoff volume based on standard WinSLAMM precipitation (1981, excluding winter):
2 Calculate volumetric runoff coefficient based on NRCS curve number for a range of rain depths. This approach used in lieu of WinSLAMM methodology because WinSLAMM only appears to acount for soil type and compaction - no factor for vegetation type.
3 Calculation runoff volume for each event based on rain depth, area, and runoff coefficient.
4 Add totals for individual storms to estimate annual reduction.
5 Check by WinSLAMM to compare results.

			Runoff Coefficient		Runoff Volume	
Event No.	Event Date	Rain Depth (In)	Lawn (1)	Native Plantings (2)	Lawn	Native
1	1/1/1981	0	0.00	0.00	0	0
2	1/6/1981	0	0.00	0.00	0	0
3	1/6/1981	0	0.00	0.00	0	0
4	1/15/1981	0	0.00	0.00	0	0
5	1/31/1981	0	0.00	0.00	0	0
6	2/5/1981	0	0.00	0.00	0	0
7	2/6/1981	0	0.00	0.00	0	0
8	2/8/1981	0	0.00	0.00	0	0
9	2/9/1981	0	0.00	0.00	0	0
10	2/10/1981	0	0.00	0.00	0	0
11	2/21/1981	0	0.00	0.00	0	0
12	2/23/1981	0	0.00	0.00	0	0
13	2/27/1981	0	0.00	0.00	0	0
14	3/10/1981	0	0.00	0.00	0	0
15	3/25/1981	0.07	0.00	0.00	0	0
16	3/29/1981	0.05	0.00	0.00	0	0
17	3/29/1981	0.06	0.00	0.00	0	0
18	3/29/1981	0.07	0.00	0.00	0	0
19	4/3/1981	0.02	0.00	0.00	0	0
20	4/3/1981	0.26	0.00	0.00	0	0
21	4/7/1981	0.71	0.01	0.00	268	0
22	4/8/1981	0.41	0.00	0.00	0	0
23	4/10/1981	1.06	0.07	0.00	2774	0
24	4/12/1981	0.13	0.00	0.00	0	0
25	4/13/1981	0.32	0.00	0.00	0	0
26	4/16/1981	0.01	0.00	0.00	0	0
27	4/19/1981	0.04	0.00	0.00	0	0
28	4/22/1981	0.01	0.00	0.00	0	0
29	4/22/1981	0.02	0.00	0.00	0	0
30	4/23/1981	0.05	0.00	0.00	0	0
31	4/28/1981	0.3	0.00	0.00	0	0
32	4/28/1981	0.06	0.00	0.00	0	0
33	4/30/1981	0.02	0.00	0.00	0	0
34	5/4/1981	0.09	0.00	0.00	0	0
35	5/10/1981	0.08	0.00	0.00	0	0
36	5/13/1981	0.01	0.00	0.00	0	0
37	5/23/1981	0.02	0.00	0.00	0	0
38	5/24/1981	0.1	0.00	0.00	0	0
39	5/29/1981	0.34	0.00	0.00	0	0
40	6/2/1981	0.01	0.00	0.00	0	0
41	6/3/1981	0.01	0.00	0.00	0	0
42	6/8/1981	0.01	0.00	0.00	0	0
43	6/8/1981	0.33	0.00	0.00	0	0
44	6/9/1981	0.07	0.00	0.00	0	0
45	6/12/1981	0.43	0.00	0.00	0	0
46	6/15/1981	2.59	0.85	0.16	31679	5817
47	6/20/1981	0.34	0.00	0.00	0	0
48	6/21/1981	0.32	0.00	0.00	0	0
49	6/23/1981	0.51	0.00	0.00	0	0
50	6/25/1981	0.13	0.00	0.00	0	0
51	6/28/1981	0.24	0.00	0.00	0	0
52	7/4/1981	0.05	0.00	0.00	0	0
53	7/11/1981	0.5	0.00	0.00	0	0
54	7/12/1981	0.14	0.00	0.00	0	0
55	7/12/1981	0.86	0.03	0.00	1051	0
56	7/13/1981	1.32	0.16	0.00	5976	0
57	7/14/1981	0.12	0.00	0.00	0	0
58	7/15/1981	0.07	0.00	0.00	0	0
59	7/18/1981	0.12	0.00	0.00	0	0
60	7/20/1981	0.54	0.00	0.00	0	0
61	7/20/1981	0.1	0.00	0.00	0	0
62	7/23/1981	0.09	0.00	0.00	0	0
63	7/25/1981	0.24	0.00	0.00	0	0
64	7/27/1981	0.66	0.00	0.00	118	0
65	8/2/1981	0.58	0.00	0.00	3	0
66	8/3/1981	0.04	0.00	0.00	0	0
67	8/5/1981	0.01	0.00	0.00	0	0
68	8/7/1981	0.02	0.00	0.00	0	0
69	8/14/1981	2.09	0.54	0.05	20039	1954
70	8/26/1981	0.49	0.00	0.00	0	0

Table 2-1 Runoff depth for selected CN's and rainfall amounts 1/

Rainfall	Runoff depth for curve number of—												
	40	45	50	55	60	65	70	75	80	85	90	95	98
	inches												
1.0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.08	0.17	0.32	0.56	0.79
1.2	.00	.00	.00	.00	.00	.00	.03	.07	.15	.27	.46	.74	.99
1.4	.00	.00	.00	.00	.00	.02	.06	.13	.24	.39	.61	.92	1.18
1.6	.00	.00	.00	.00	.01	.05	.11	.20	.34	.52	.76	1.11	1.38
1.8	.00	.00	.00	.00	.03	.09	.17	.29	.44	.65	.93	1.29	1.58
2.0	.00	.00	.00	.02	.06	.14	.24	.38	.56	.80	1.09	1.48	1.77
2.5	.00	.00	.02	.08	.17	.30	.46	.65	.89	1.18	1.53	1.96	2.27
3.0	.00	.02	.09	.19	.33	.51	.71	.96	1.25	1.59	1.98	2.45	2.77
3.5	.02	.08	.20	.35	.53	.75	1.01	1.30	1.64	2.02	2.45	2.94	3.27
4.0	.06	.18	.33	.53	.76	1.03	1.33	1.67	2.04	2.46	2.92	3.43	3.77
4.5	.14	.30	.50	.74	1.02	1.33	1.67	2.05	2.46	2.91	3.40	3.92	4.26
5.0	.24	.44	.69	.98	1.30	1.65	2.04	2.45	2.89	3.37	3.88	4.42	4.76
6.0	.50	.80	1.14	1.52	1.92	2.35	2.81	3.28	3.78	4.30	4.85	5.41	5.76
7.0	.84	1.24	1.68	2.12	2.60	3.10	3.62	4.15	4.69	5.25	5.82	6.41	6.76
8.0	1.25	1.74	2.25	2.78	3.33	3.89	4.46	5.04	5.63	6.21	6.81	7.40	7.76
9.0	1.71	2.29	2.88	3.49	4.10	4.72	5.33	5.95	6.57	7.18	7.79	8.40	8.76
10.0	2.23	2.89	3.56	4.23	4.90	5.56	6.22	6.88	7.52	8.16	8.78	9.40	9.76
11.0	2.78	3.52	4.26	5.00	5.72	6.43	7.13	7.81	8.48	9.13	9.77	10.39	10.76
12.0	3.38	4.19	5.00	5.79	6.56	7.32	8.05	8.76	9.45	10.11	10.76	11.39	11.76
13.0	4.00	4.89	5.76	6.61	7.42	8.21	8.98	9.71	10.42	11.10	11.76	12.39	12.76
14.0	4.65	5.62	6.55	7.44	8.30	9.12	9.91	10.67	11.39	12.08	12.75	13.39	13.76
15.0	5.33	6.36	7.35	8.29	9.19	10.04	10.85	11.63	12.37	13.07	13.74	14.39	14.76

RCN

Rain Depth (in.)	HSG A		HSG B		HSG C		HSG D	
	Lawn (CN=39)	Native (CN=30)	Lawn (CN=61)	Native (CN=58)	Lawn (CN=74)	Native (CN=71)	Lawn (CN=80)	Native (CN=78)
	39	30	61	58	74	71	80	78
1	0	0	0.00	0.00	0.02	0.01	0.08	0.06
2	0	0	0.04	0.02	0.17	0.13	0.28	0.24
3	0	0	0.12	0.09	0.30	0.25	0.42	0.38
4	0.01	0	0.20	0.17	0.40	0.35	0.51	0.47
5	0.04	0	0.27	0.23	0.47	0.42	0.58	0.54

$$Q = \frac{(P - I_a)^2}{(P - I_a) + S} \qquad \text{[eq. 2-1]}$$

where

Q = runoff (in)
P = rainfall (in)
S = potential maximum retention after runoff begins (in) and
I_a = initial abstraction (in)

Runoff

CN	S	Ia	0.50	1.00	2.00	3.00	4.00	5.00
30.00	23.33	4.67	0.00	0.00	0.00	0.00	0.00	0.00
39.00	15.64	3.13	0.00	0.00	0.00	0.00	0.05	0.20
58.00	7.24	1.45	0.00	0.00	0.04	0.27	0.66	1.17
61.00	6.39	1.28	0.00	0.00	0.07	0.37	0.81	1.37
71.00	4.08	0.82	0.00	0.01	0.27	0.76	1.39	2.12
74.00	3.51	0.70	0.00	0.02	0.35	0.91	1.60	2.36
78.00	2.82	0.56	0.00	0.06	0.48	1.13	1.89	2.71
80.00	2.50	0.50	0.00	0.08	0.56	1.25	2.04	2.89

Runoff Coefficient

CN	S	Ia	0.50	1.00	2.00	3.00	4.00	5.00
30.00	23.33	4.67	0.00	0.00	0.00	0.00	0.00	0.00
39.00	15.64	3.13	0.00	0.00	0.00	0.00	0.01	0.04
58.00	7.24	1.45	0.00	0.00	0.02	0.09	0.17	0.23
61.00	6.39	1.28	0.00	0.00	0.04	0.12	0.20	0.27
71.00	4.08	0.82	0.00	0.01	0.13	0.25	0.35	0.42
74.00	3.51	0.70	0.00	0.02	0.17	0.30	0.40	0.47
78.00	2.82	0.56	0.00	0.06	0.24	0.38	0.47	0.54
80.00	2.50	0.50	0.00	0.08	0.28	0.42	0.51	0.58

Reference Runoff Coefficients:

Land Use	Percent Impervious Area	Hydrologic Soil Group A Slope Range Percent 0-2	A 2-6	A 6 & over	B 0-2	B 2-6	B 6 & over	C 0-2	C 2-6	C 6 & over	D 0-2	D 2-6	D 6 & over
Industrial	90	0.67 0.85	0.68 0.85	0.68 0.86	0.68 0.85	0.68 0.86	0.69 0.86	0.68 0.86	0.69 0.86	0.69 0.87	0.69 0.86	0.69 0.86	0.70 0.88
Commercial	95	0.71 0.88	0.71 0.89	0.72 0.89	0.71 0.89	0.72 0.89	0.72 0.89	0.72 0.89	0.72 0.89	0.72 0.90	0.72 0.89	0.72 0.89	0.72 0.90
High Density Residential	60	0.47 0.58	0.49 0.60	0.50 0.61	0.48 0.59	0.50 0.61	0.52 0.64	0.49 0.60	0.51 0.62	0.54 0.66	0.51 0.62	0.53 0.64	0.56 0.69
Med. Density Residential	30	0.25 0.33	0.28 0.37	0.31 0.40	0.27 0.35	0.30 0.39	0.35 0.44	0.30 0.38	0.33 0.42	0.38 0.49	0.33 0.41	0.36 0.45	0.42 0.54
Low Density Residential	15	0.14 0.22	0.19 0.26	0.22 0.29	0.17 0.24	0.21 0.28	0.26 0.34	0.20 0.28	0.25 0.32	0.31 0.40	0.24 0.31	0.28 0.35	0.35 0.46
Agriculture	5	0.08 0.14	0.13 0.18	0.16 0.22	0.11 0.16	0.15 0.21	0.21 0.28	0.14 0.20	0.19 0.25	0.26 0.34	0.18 0.24	0.23 0.29	0.31 0.41
Open Space	2	0.05 0.11	0.10 0.16	0.14 0.20	0.08 0.14	0.13 0.19	0.19 0.26	0.12 0.18	0.17 0.23	0.24 0.32	0.16 0.22	0.21 0.27	0.28 0.39
Freeways & Expressways	70	0.57 0.70	0.59 0.71	0.60 0.72	0.58 0.71	0.60 0.72	0.61 0.74	0.59 0.72	0.61 0.73	0.63 0.76	0.60 0.73	0.62 0.75	0.64 0.78

WinSLAMM

	Runoff Coefficient

71	8/26/1981	1.63	0.29	0.00	10935	166
72	8/28/1981	0.62	0.00	0.00	41	0
73	8/28/1981	0.04	0.00	0.00	0	0
74	8/31/1981	0.03	0.00	0.00	0	0
75	8/31/1981	1.52	0.24	0.00	9051	26
76	9/7/1981	0.89	0.03	0.00	1263	0
77	9/11/1981	0.08	0.00	0.00	0	0
78	9/16/1981	0.03	0.00	0.00	0	0
79	9/21/1981	0.45	0.00	0.00	0	0
80	9/24/1981	0.9	0.04	0.00	1337	0
81	9/26/1981	0.12	0.00	0.00	0	0
82	9/28/1981	0.1	0.00	0.00	0	0
83	9/29/1981	0.16	0.00	0.00	0	0
84	9/30/1981	0.36	0.00	0.00	0	0
85	10/1/1981	0.01	0.00	0.00	0	0
86	10/4/1981	0.15	0.00	0.00	0	0
87	10/5/1981	0.04	0.00	0.00	0	0
88	10/5/1981	0.02	0.00	0.00	0	0
89	10/9/1981	0.14	0.00	0.00	0	0
90	10/13/1981	1.2	0.12	0.00	4376	0
91	10/15/1981	0.02	0.00	0.00	0	0
92	10/17/1981	0.95	0.05	0.00	1737	0
93	10/18/1981	0.06	0.00	0.00	0	0
94	10/21/1981	0.06	0.00	0.00	0	0
95	10/21/1981	0.01	0.00	0.00	0	0
96	10/24/1981	0.01	0.00	0.00	0	0
97	10/31/1981	0.01	0.00	0.00	0	0
98	11/5/1981	0.04	0.00	0.00	0	0
99	11/15/1981	0.07	0.00	0.00	0	0
100	11/18/1981	0.05	0.00	0.00	0	0
101	11/19/1981	0.26	0.00	0.00	0	0
102	11/23/1981	0.18	0.00	0.00	0	0
103	11/25/1981	0.89	0.03	0.00	1263	0
104	11/30/1981	0.37	0.00	0.00	0	0
105	12/3/1981	0	0.00	0.00	0	0
106	12/14/1981	0	0.00	0.00	0	0
107	12/20/1981	0	0.00	0.00	0	0
108	12/26/1981	0	0.00	0.00	0	0
109	12/31/1981	0	0.00	0.00	0	0
Total Runoff Volume (cf)					**91,911**	**7,963**

Difference	83,948	cf/yr
	627,930	gal/yr

Rain Depth (in)	Sandy Soils	Silty Soils	Clayey Soils
0.04	0	0	0
0.08	0	0	0
0.12	0	0	0
0.2	0	0	0
0.39	0.005	0.021	0.023
0.59	0.007	0.03	0.038
0.79	0.01	0.042	0.058
0.98	0.012	0.044	0.069
1.2	0.014	0.052	0.076
1.6	0.016	0.054	0.12
2	0.018	0.2	0.2
2.4	0.019	0.2	0.2
2.8	0.02	0.2	0.2
3.2	0.021	0.2	0.2
3.5	0.022	0.2	0.2
3.9	0.023	0.2	0.25
4.5	0.024	0.2	0.3

Check by WinSLAMM Analysis

		Runoff Volume		
Case 1:	Large Landscape Area -Clay - Moderate Compaction	65,127	cf/yr	487,150
Case 2:	Large Landscape Area - Silt - Normal Compaction	5,386	cf/yr	40,287
			Difference	446,863

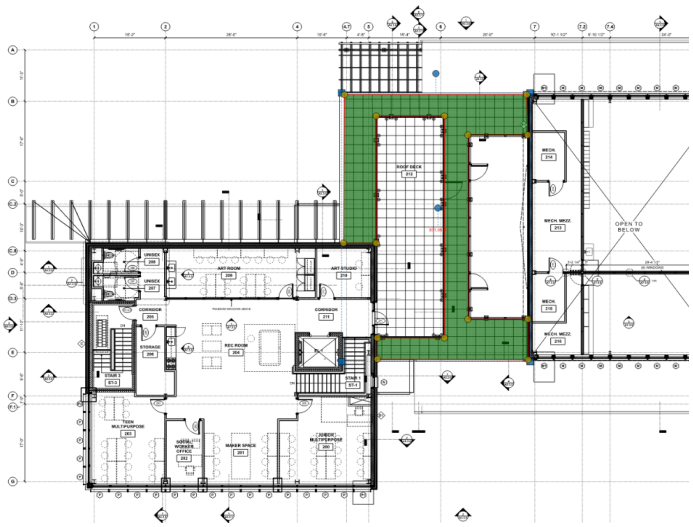
Conclusion: Both methods suggest conversion of turf areas to native planting areas may reduce runoff volume over the site by approximately 400,000 - 600,000 gal/per year,

ATTACHMENT 5 - GREEN ROOF CALCULATIONS

Bayview - Green Infrastructure Design
Green Roof Volume

Area: **871** **sf**
Porosity **0.25**
otal Volume **108.875** **cf**

Event No.	Event Date	Rain Depth (In)	Runoff Volume (cf)	Volume Captured
1	1/1/1981	0	0	0
2	1/6/1981	0	0	0
3	1/6/1981	0	0	0
4	1/15/1981	0	0	0
5	1/31/1981	0	0	0
6	2/5/1981	0	0	0
7	2/6/1981	0	0	0
8	2/8/1981	0	0	0
9	2/9/1981	0	0	0
10	2/10/1981	0	0	0
11	2/21/1981	0	0	0
12	2/23/1981	0	0	0
13	2/27/1981	0	0	0
14	3/10/1981	0	0	0
15	3/25/1981	0.07	61	61
16	3/29/1981	0.05	44	44
17	3/29/1981	0.06	52	52
18	3/29/1981	0.07	61	61
19	4/3/1981	0.02	17	17
20	4/3/1981	0.26	226	109
21	4/7/1981	0.71	618	109
22	4/8/1981	0.41	357	109
23	4/10/1981	1.06	923	109
24	4/12/1981	0.13	113	109
25	4/13/1981	0.32	279	109
26	4/16/1981	0.01	9	9
27	4/19/1981	0.04	35	35
28	4/22/1981	0.01	9	9
29	4/22/1981	0.02	17	17
30	4/23/1981	0.05	44	44
31	4/28/1981	0.3	261	109
32	4/28/1981	0.06	52	52
33	4/30/1981	0.02	17	17
34	5/4/1981	0.09	78	78
35	5/10/1981	0.08	70	70
36	5/13/1981	0.01	9	9
37	5/23/1981	0.02	17	17
38	5/24/1981	0.1	87	87
39	5/29/1981	0.34	296	109
40	6/2/1981	0.01	9	9
41	6/3/1981	0.01	9	9
42	6/8/1981	0.01	9	9
43	6/8/1981	0.33	287	109
44	6/9/1981	0.07	61	61
45	6/12/1981	0.43	375	109
46	6/15/1981	2.59	2,256	109
47	6/20/1981	0.34	296	109
48	6/21/1981	0.32	279	109



49	6/23/1981	0.51	444	109
50	6/25/1981	0.13	113	109
51	6/28/1981	0.24	209	109
52	7/4/1981	0.05	44	44
53	7/11/1981	0.5	436	109
54	7/12/1981	0.14	122	109
55	7/12/1981	0.86	749	109
56	7/13/1981	1.32	1,150	109
57	7/14/1981	0.12	105	105
58	7/15/1981	0.07	61	61
59	7/18/1981	0.12	105	105
60	7/20/1981	0.54	470	109
61	7/20/1981	0.1	87	87
62	7/23/1981	0.09	78	78
63	7/25/1981	0.24	209	109
64	7/27/1981	0.66	575	109
65	8/2/1981	0.58	505	109
66	8/3/1981	0.04	35	35
67	8/5/1981	0.01	9	9
68	8/7/1981	0.02	17	17
69	8/14/1981	2.09	1,820	109
70	8/26/1981	0.49	427	109
71	8/26/1981	1.63	1,420	109
72	8/28/1981	0.62	540	109
73	8/28/1981	0.04	35	35
74	8/31/1981	0.03	26	26
75	8/31/1981	1.52	1,324	109
76	9/7/1981	0.89	775	109
77	9/11/1981	0.08	70	70
78	9/16/1981	0.03	26	26
79	9/21/1981	0.45	392	109
80	9/24/1981	0.9	784	109
81	9/26/1981	0.12	105	105
82	9/28/1981	0.1	87	87
83	9/29/1981	0.16	139	109
84	9/30/1981	0.36	314	109
85	10/1/1981	0.01	9	9
86	10/4/1981	0.15	131	109
87	10/5/1981	0.04	35	35
88	10/5/1981	0.02	17	17
89	10/9/1981	0.14	122	109
90	10/13/1981	1.2	1,045	109
91	10/15/1981	0.02	17	17
92	10/17/1981	0.95	827	109
93	10/18/1981	0.06	52	52
94	10/21/1981	0.06	52	52
95	10/21/1981	0.01	9	9
96	10/24/1981	0.01	9	9
97	10/31/1981	0.01	9	9
98	11/5/1981	0.04	35	35
99	11/15/1981	0.07	61	61
100	11/18/1981	0.05	44	44
101	11/19/1981	0.26	226	109
102	11/23/1981	0.18	157	109
103	11/25/1981	0.89	775	109
104	11/30/1981	0.37	322	109
105	12/3/1981	0	0	0
106	12/14/1981	0	0	0
107	12/20/1981	0	0	0
108	12/26/1981	0	0	0
109	12/31/1981	0	0	0

Total Runoff Volume (cf)		**25,094**	**6,576**

Total Runoff	25,094	cf
	187,699	gal
Captured	6,576	cf
	49,189	gal
% Red.	73.8%	

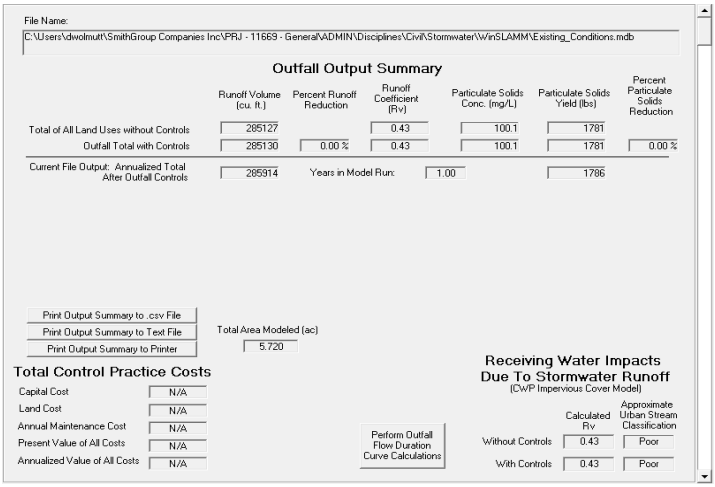
ATTACHMENT 6 - OVERALL SITE VOLUME REDUCTIONS

Bayview - Green Infrastructure Design
Overall Reductions
Compare As-Designed with Regulatory Requirement:

1. Existing Conditions

Land Use Totals (Does not include exis and new public ROW areas)

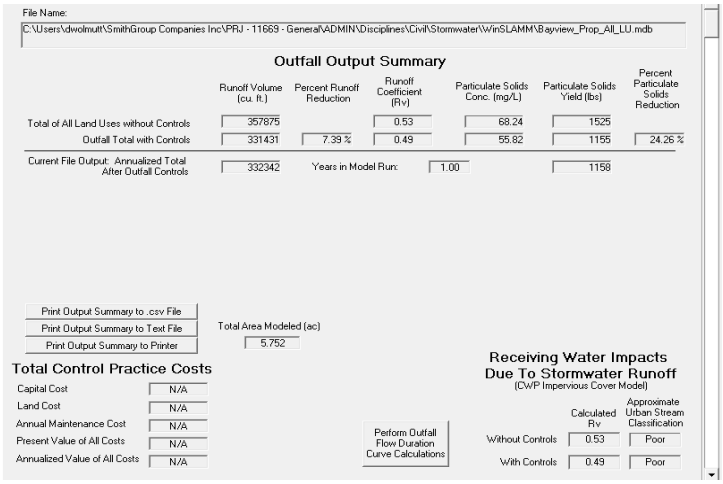
Land Use	Square Fee	Acres	percent	
Roofs	59432	1.364	24%	1.36
Parking an	0	0.000	0%	
Parking an	37311	0.857	15%	0.86
Walks	39600	0.909	16%	0.91
Landscape	112915	2.592	45%	2.59
Total	**249258**	**5.722**	1	5.72



2. Proposed Conditions:

Overall Land Use:

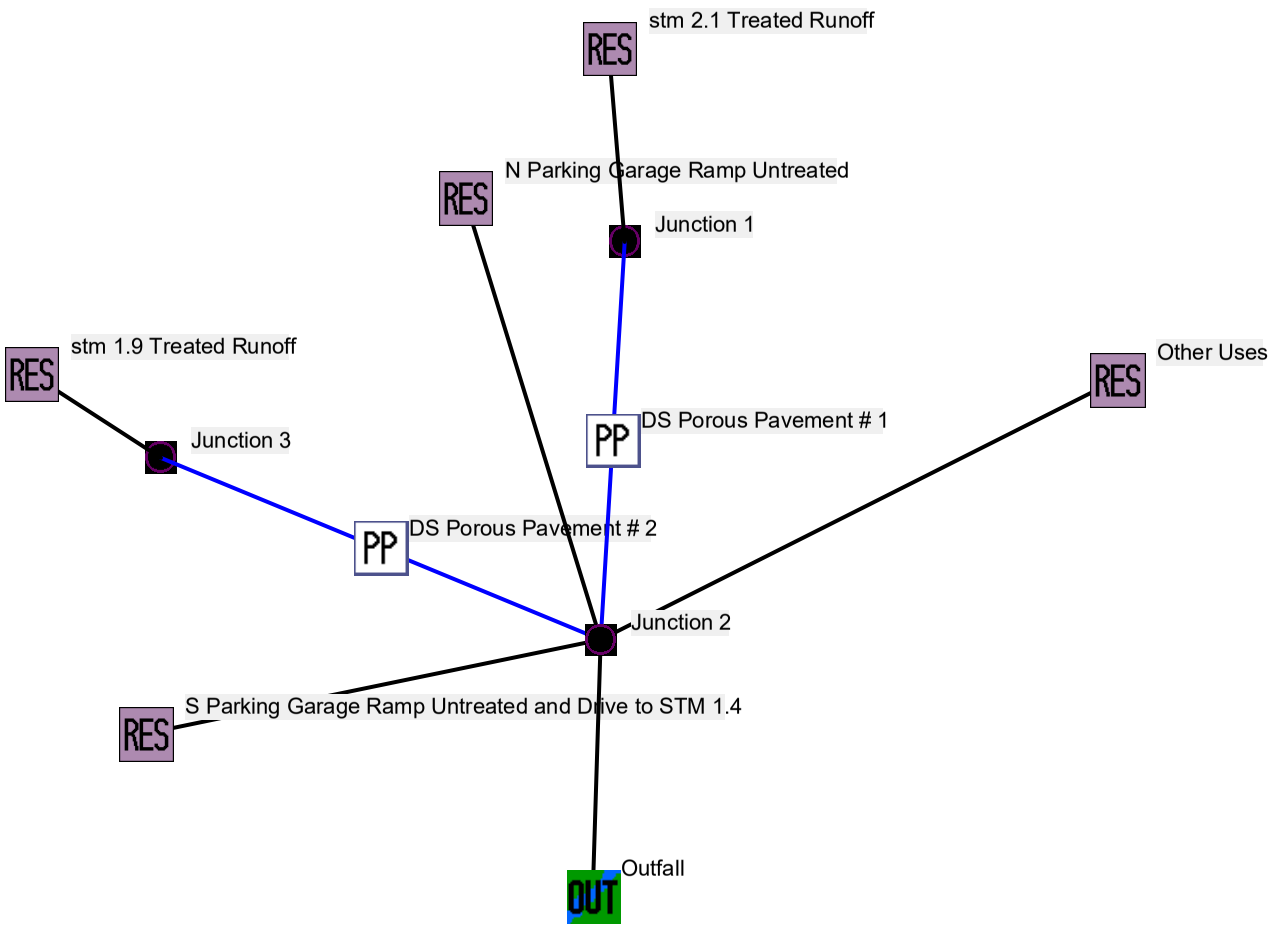
Source Area	Roofs (ac)	Walks (ac)	Driving (bypass PP)	Driving (To PP)	Landscape (ac)	Total (ac)
STM 2.1	0.12	0.097	0.027	0.193	0.241	0.678
STM 1.9	0.004	0.131	0.038	0.187	0.196	0.556
S Garage			0.014			0.014
Other	1.809	0.885			1.78	4.474
	1.933	1.113	0.079	0.38	2.217	5.722



WinSLAMM Results (Overall 5.72-acre site)

Condition	Site Area (Ac)	Runoff Volume cf/yr	Runoff Volume gal/yr
Existing Conditions	5.72	285,127	2,132,750
Proposed Conditions (wo/Pr)	5.72	357,875	2,676,905
Proposed Conditions (w/Pr)	5.72	186,695	1,396,476

GI Practice	Runoff Volume cf/yr	Runoff Volume gal/yr
Permeable Pavement	26,444	197,801
N Cistern	19,642	146,919
S Cistern	16,053	120,075
Native Plantings	83,948	627,930
Green Roof	25,094	187,703
Total Captured	171,180	1,280,429


stm 2.1 Treated Runoff
RES
N Parking Garage Ramp Untreated
RES
Junction 1
stm 1.9 Treated Runoff
RES
Other Uses
RES
Junction 3
PP
DS Porous Pavement # 1
PP
DS Porous Pavement # 2
Junction 2
S Parking Garage Ramp Untreated and Drive to STM 1.4
RES
Outfall
OUT

Data file name: C:\Users\dwolmutt\SmithGroup Companies Inc\PRJ - 11669 - General\ADMIN\Disciplines\Civil\Stormwater\WinSLAMM\Existing_Conditions.mdb
WinSLAMM Version 10.4.1
Rain file name: C:\WinSLAMM Files\Rain Files\WI_Multi_rain\Madison\WisReg - Madison WI Annual 1981.ran
Particulate Solids Concentration file name: C:\WinSLAMM Files\v10.1 WI_AVG01.pscx
Runoff Coefficient file name: C:\WinSLAMM Files\WI_SL06 Dec06.rsvx
Residential Street Delivery file name: C:\WinSLAMM Files\WI_Res and Other Urban Dec06.std
Institutional Street Delivery file name: C:\WinSLAMM Files\WI_Com Inst Indust Dec06.std
Commercial Street Delivery file name: C:\WinSLAMM Files\WI_Com Inst Indust Dec06.std
Industrial Street Delivery file name: C:\WinSLAMM Files\WI_Com Inst Indust Dec06.std
Other Urban Street Delivery file name: C:\WinSLAMM Files\WI_Res and Other Urban Dec06.std
Freeway Street Delivery file name: C:\WinSLAMM Files\Freeway Dec06.std
Apply Street Delivery Files to Adjust the After Event Load Street Dirt Mass Balance: False
Pollutant Relative Concentration file name: C:\WinSLAMM Files\WI_GEO03.ppdx
Source Area PSD and Peak to Average Flow Ratio File: C:\WinSLAMM Files\NURP Source Area PSD Files.csv
Cost Data file name:
Seed for random number generator: -42
Study period starting date: 01/01/81 Study period ending date: 12/31/81
Start of Winter Season: 12/02 End of Winter Season: 03/12
Date: 02-02-2021 Time: 09:34:07
Site information:

LU# 1 - Residential: Residential 1 Total area (ac): 5.720
1 - Roofs 1: 1.364 ac. Pitched Connected PSD File: C:\WinSLAMM Files\NURP.cpz
14 - Paved Parking 2: 0.857 ac. Connected PSD File: C:\WinSLAMM Files\NURP.cpz
25 - Driveways 1: 0.909 ac. Connected PSD File: C:\WinSLAMM Files\NURP.cpz
45 - Large Landscaped Areas 1: 2.590 ac. Normal Clayey PSD File: C:\WinSLAMM Files\NURP.cpz

Data file name: C:\Users\dwolmutt\SmithGroup Companies Inc\PRJ - 11669 - General\ADMIN\Disciplines\Civil\Stormwater\WinSLAMM\Bayview_Prop_All_LU.mdb
WinSLAMM Version 10.4.1
Rain file name: C:\WinSLAMM Files\Rain Files\WisReg - Madison WI 1981.RAN
Particulate Solids Concentration file name: C:\WinSLAMM Files\v10.1 WI_AVG01.pscx
Runoff Coefficient file name: C:\WinSLAMM Files\WI_SL06 Dec06.rsvx
Residential Street Delivery file name: C:\WinSLAMM Files\WI_Res and Other Urban Dec06.std
Institutional Street Delivery file name: C:\WinSLAMM Files\WI_Com Inst Indust Dec06.std
Commercial Street Delivery file name: C:\WinSLAMM Files\WI_Com Inst Indust Dec06.std
Industrial Street Delivery file name: C:\WinSLAMM Files\WI_Com Inst Indust Dec06.std
Other Urban Street Delivery file name: C:\WinSLAMM Files\WI_Res and Other Urban Dec06.std
Freeway Street Delivery file name: C:\WinSLAMM Files\Freeway Dec06.std
Apply Street Delivery Files to Adjust the After Event Load Street Dirt Mass Balance: False
Pollutant Relative Concentration file name: C:\WinSLAMM Files\WI_GEO03.ppdx
Source Area PSD and Peak to Average Flow Ratio File: C:\WinSLAMM Files\NURP Source Area PSD Files.csv
Cost Data file name:
Seed for random number generator: -42
Study period starting date: 01/01/81 Study period ending date: 12/31/81
Date: 02-02-2021 Time: 10:29:34
Site information:

LU# 1 - Residential: stm 2.1 Treated Runoff Total area (ac): 0.651
1 - Roofs 1: 0.120 ac. Pitched Connected PSD File: C:\WinSLAMM Files\NURP.cpz
13 - Paved Parking 1: 0.101 ac. Connected PSD File: C:\WinSLAMM Files\NURP.cpz
25 - Driveways 1: 0.092 ac. Connected PSD File: C:\WinSLAMM Files\NURP.cpz
31 - Sidewalks 1: 0.097 ac. Connected PSD File: C:\WinSLAMM Files\NURP.cpz
51 - Small Landscaped Areas 1: 0.241 ac. Normal Silty PSD File: C:\WinSLAMM Files\NURP.cpz

LU# 2 - Residential: N Parking Garage Ramp Untreated Total area (ac): 0.027
13 - Paved Parking 1: 0.027 ac. Connected PSD File: C:\WinSLAMM Files\NURP.cpz

LU# 3 - Residential: stm 1.9 Treated Runoff Total area (ac): 0.548
1 - Roofs 1: 0.004 ac. Pitched Connected PSD File: C:\WinSLAMM Files\NURP.cpz
13 - Paved Parking 1: 0.091 ac. Connected PSD File: C:\WinSLAMM Files\NURP.cpz
25 - Driveways 1: 0.096 ac. Connected PSD File: C:\WinSLAMM Files\NURP.cpz
31 - Sidewalks 1: 0.161 ac. Connected PSD File: C:\WinSLAMM Files\NURP.cpz
51 - Small Landscaped Areas 1: 0.196 ac. Normal Silty PSD File: C:\WinSLAMM Files\NURP.cpz

LU# 4 - Residential: S Parking Garage Ramp Untreated and Drive to STM 1.4 Total area (ac): 0.052
25 - Driveways 1: 0.052 ac. Connected PSD File: C:\WinSLAMM Files\NURP.cpz

LU# 5 - Residential: Other Uses Total area (ac): 4.474
1 - Roofs 1: 1.809 ac. Pitched Connected PSD File: C:\WinSLAMM Files\NURP.cpz
31 - Sidewalks 1: 0.885 ac. Connected PSD File: C:\WinSLAMM Files\NURP.cpz
51 - Small Landscaped Areas 1: 1.780 ac. Normal Clayey PSD File: C:\WinSLAMM Files\NURP.cpz

Control Practice 1: Porous Pavement CP# 1 (DS) - DS Porous Pavement # 1
Porous pavement area (ac): 0.101
Inflow hydrograph peak to average flow ratio: 3.8
Porous pavement thickness (in): 4
Porous pavement porosity: 0.2
Aggregate bedding thickness (in): 5
Aggregate bedding porosity: 0.3
Aggregate base reservoir thickness (in): 12
Aggregate base reservoir porosity: 0.3
Underdrain diameter (in): 6
Underdrain outlet invert elevation (inches above datum): 0
Number of underdrains: 1
Subgrade seepage rate (in/hr): 0.3
Use random number generation to account for uncertainty in seepage rate: 0
Subgrade seepage rate COV: 0
Surface pavement initial infiltration rate (in/hr): 100
Surface pavement initial infiltration rate (in/hr): 100
Surface Pavement Percent Solids Removal Upon Cleaning: 50
Porous pavement surface clogging load (lbs/sf): 0.06
Porous pavement restorative cleaning frequency: Semi-annually
TSS concentration reduction percentage through underdrain: 65
Porous pavement particle size distribution file name: Not needed - calculated by program

Control Practice 2: Porous Pavement CP# 2 (DS) - DS Porous Pavement # 2
Porous pavement area (ac): 0.091
Inflow hydrograph peak to average flow ratio: 3.8
Porous pavement thickness (in): 4
Porous pavement porosity: 0.2
Aggregate bedding thickness (in): 5
Aggregate bedding porosity: 0.3
Aggregate base reservoir thickness (in): 12
Aggregate base reservoir porosity: 0.3
Underdrain diameter (in): 6
Underdrain outlet invert elevation (inches above datum): 0
Number of underdrains: 1
Subgrade seepage rate (in/hr): 0.3
Use random number generation to account for uncertainty in seepage rate: 0
Subgrade seepage rate COV: 0
Surface pavement initial infiltration rate (in/hr): 100
Surface pavement initial infiltration rate (in/hr): 100
Surface Pavement Percent Solids Removal Upon Cleaning: 50
Porous pavement surface clogging load (lbs/sf): 0.06
Porous pavement restorative cleaning frequency: Semi-annually
TSS concentration reduction percentage through underdrain: 0
Porous pavement particle size distribution file name: Not needed - calculated by program

SLAMM for Windows Version 10.4.1

Data file name: C:\Users\dwolmutt\SmithGroup Companies Inc\PRJ - 11669 - General\ADMIN\Disciplines\Civil\Stormwater\WinSLAMM\Bayview_Prop_All_LU.mdb
WinSLAMM Version 10.4.1
Rain file name: C:\WinSLAMM Files\Rain Files\WisReg - Madison WI 1981.RAN
Particulate Solids Concentration file name: C:\WinSLAMM Files\v10.1 WI_AVG01.pscx
Runoff Coefficient file name: C:\WinSLAMM Files\WI_SL06 Dec06.rsvx
Pollutant Relative Concentration file name: C:\WinSLAMM Files\WI_GEO03.ppdx
Residential Street Delivery file name: C:\WinSLAMM Files\WI_Res and Other Urban Dec06.std
Institutional Street Delivery file name: C:\WinSLAMM Files\WI_Com Inst Indust Dec06.std
Commercial Street Delivery file name: C:\WinSLAMM Files\WI_Com Inst Indust Dec06.std
Industrial Street Delivery file name: C:\WinSLAMM Files\WI_Com Inst Indust Dec06.std
Other Urban Street Delivery file name: C:\WinSLAMM Files\WI_Res and Other Urban Dec06.std
Freeway Street Delivery file name: C:\WinSLAMM Files\Freeway Dec06.std
Apply Street Delivery Files to Adjust the After Event Load Street Dirt Mass Balance: False
Source Area PSD and Peak to Average Flow Ratio File: C:\WinSLAMM Files\NURP Source Area PSD Files.csv
Cost Data file name:
Seed for random number generator: -42
Study period starting date: 01/01/81 Study period ending date: 12/31/81
Model Run Start Date: 01/01/81 Model Run End Date: 12/31/81
Date of run: 02-02-2021 Time of run: 10:28:22
Total Area Modeled (acres): 5.752
Years in Model Run: 1.00

	Runoff Volume (cu ft)	Percent Runoff Volume Reduction	Particulate Solids Conc. (mg/L)	Particulate Solids Yield (lbs)	Percent Particulate Solids Reduction
Total of all Land Uses without Controls:	357875	-	68.24	1525	-
Outfall Total with Controls:	331431	7.39%	55.82	1155	24.26%
Annualized Total After Outfall Controls:	332342			1158	

Bayview Unit Delivery Schedule 5/20/2020

Phase	Bldg	Type	Units	Construction Start	PIS	Duration
1	1	48-unit apt	48	4/1/2021	3/1/2022	334
1		Tenant Moves		3/3/2022	4/2/2022	30
1		Demo		4/2/2022	5/2/2022	30
2	2	25-unit apt	25	5/2/2022	3/1/2023	303
2	11	6 twnhm	6	6/1/2022	12/1/2022	183
2	10	7 twnhm	7	6/22/2022	1/22/2023	214
2	3	CC		5/2/2022	3/3/2023	305
2		Tenant Moves		3/5/2023	4/4/2023	30
2		Demo		4/4/2023	5/19/2023	45
3	8	6 twnhm	6	5/19/2023	11/17/2023	182
3	9	6 twnhm	6	6/9/2023	12/8/2023	182
3	7	6 twnhm	6	6/30/2023	12/29/2023	182
3	6	6 twnhm	6	7/21/2023	2/9/2024	203
3	5	6 twnhm	6	8/11/2023	3/22/2024	224
3	4	14 twnhm	14	9/1/2023	5/1/2024	243
			130			

Note: This schedule is subject to change.

Watershed Characteristics Attachment

1. Existing Conditions

1.1. Existing Land Use

The proposed project site is currently zoned as TR-U1 (Traditional Residential Urban District 1) and includes five multi-family apartment buildings, a community center and two separate surface parking lots. The building rooftops, parking lots, sidewalks, and other miscellaneous paved areas result in a total impervious area of approximately 3.13 acres, as shown in Table 1 and Exhibit 1.

Table 1: Existing Land Use Summary

Land Use	Area (Acre)	Area (%)
Building Roof	1.36	24
Paved Parking/ Drives (Vehicular)	0.86	15
Walkways (Non-Vehicular)	0.91	16
Open Space	2.59	45
Total	5.72	100

1.2. Existing Drainage Patterns

The site currently drains to Lake Monona (Rock River Watershed) via a public storm sewer draining southwesterly along West Washington Avenue then southerly through Brittingham Park. Internal portions of the site, including the west parking lot and community center, are drained by a storm sewer line connected to the 24-inch storm sewer in West Washington Avenue. This storm sewer is greatly undersized and has caused flooding of the community center on several occasions in the past. External portions of the site, including the east parking lot, primarily drain by sheet flow directly on to adjacent City right-of-way. The existing site was developed prior to adoption of City stormwater management standards and does not currently include practices to control peak discharge rates, runoff volumes, or pollutant loading.

2. Post Construction Stormwater Management

2.1. Proposed Land Use

Proposed construction includes phased demolition of the existing five apartment buildings, community center, and all pavement surfaces on the 5.7-acre site, construction of 10 new multi-family buildings, a new community center building, two parking lots including a total of 50 parking spaces, walks, community gardens, and landscaped areas. In addition, a new 66-foot public right-of way will be dedicated on the western edge of the site to connect West Washington Avenue, Braxton Place, and Regent Street. The proposed development will increase the overall site imperviousness from 55% to 61%, for an increase in impervious surface of approximately 16,300 square feet (0.374 acres). Proposed land uses are shown in Exhibit 2 and Table 2:

Table 2: Proposed Land Use Summary

Land Use	Area (Acre)	Area (%)
Building Roof	1.93	34
Paved Parking/ Drives (Vehicular)	0.43	7
Impervious Surface (Non-Vehicular)	1.14	20
Open Space	2.22	39
	5.72	100

2.2. Proposed Drainage Patterns

The project will include complete demolition of the existing drainage system with new inlets, storm sewers, and stormwater management practices. In general, the new drainage system will consist of storm sewers collecting internal drainage and routing it generally westerly to the proposed new City right-of-way on the west side of the site. It is anticipated that the new storm sewer within the right-of-way will be publicly owned and will connect to the West Washington Avenue storm sewer at the future intersection of the new public street with West Washington Avenue. Proposed storm sewer sizes based on preliminary storm sewer modeling are shown on the civil engineering plans submitted under separate cover concurrently with this report.

Current Level of Pollution Control

There are currently no stormwater management practices present on site. Pollutant load modeling using the WinSLAMM model indicates an annual TSS load of 1,781 pounds from the 5.72-acre site and an annual runoff volume of approximately 285,000 cubic feet.

601 Bayview

Green Infrastructure Practices

Opinion of Probable Cost

GI Component		BASE COST (1) Unit	Unit Price	Qty	Cost	Total	DEDUCT (2) Unit Price	Qty	Cost	Total	Grant Eligible (3)
Permeable Pavers		SF	$20.00	8,640	$172,800		$20.00	6,940	$138,800		
						$172,800				$138,800	$34,000
Green Roof											
	Irrigation System	LS	$4,000.00	1	$4,000						
	Components	SF	$70.00	860	$60,200		$10.00	860	$8,600		
	Construction	LS	$45,000.00	1	$45,000						
						$109,200				$8,600	$100,600
Water Harvesting - North											
	PVC Pipe Collection System	LF	$30.00	850	$25,500						
	Ecobloc Cistern	GAL	$4.50	15,000	$67,500						
	Distribution System (Spigots/Piping)	LF	$15.00	80	$1,200						
	Pumps/Controls	LS	$5,000.00	1	$5,000						
	Disinfection System	LS	$2,000.00	1	$2,000						
	Community Garden Soils	CY	$40.00	226	$9,040		$30.00	113	$3,390		
						$110,240				$3,390	$106,850
Water Harvesting - South											
	PVC Pipe Collection System	LF	$30.00	300	$9,000						
	Ecoblocks Cistern	Gal	$4.50	10,000	$45,000						
	Distribution System (Spigots/Piping)	LF	$15.00	80	$1,200						
	Pumps/Controls/	LS	$5,000.00	1	$5,000						
	Disinfection System	LS	$2,000.00	1	$2,000						
	Community Garden Soils	CY	$40.00	21	$840		$30.00	11	$330.00		
						$63,040				$330	$62,710
"Nonstructural" Items											
	Interpretive Educational Signage	LS	$18,000.00	1	$18,000						
	Water Conservation Education and	LS	$65,000.00	1	$65,000						
						$83,000				$0	$83,000
Native Plantings											
	Plantings	SF	$5.50	37,400	$205,700		$0.80	37,400	$29,920		
	Topsoil	CY	$30.00	1,385	$41,550		$30.00	692	$20,760		
						$247,250				$50,680	$196,570
Subtotal						$785,530				$201,800	$583,730
Contingency (20%)						$157,106				$40,360	$116,746
Design (15%)						$117,830				$30,270	$87,560
Grand Total						$1,060,466				$272,430	**$788,036**

Notes:

1 Opinion of Probable Construction Cost for proposed GI Improvements

2 Probable Cost of typical "non-GI"

a. Standard rooftop rather than

b. 6" standard topsoil versus 12"

c. Standard turf/6" topsoil versus

Bayview Townhouses
Sources and Uses Statement
January 31, 2021

Sources of Funds	Adjust for 4% Floor
Permanent Mortgage - WHEDA Bonds	$ 14,140,000
WHEDA Subordinate Bonds	$ 1,590,625
City of Madison Affordable Housing Fund	$ 2,900,000
Dane County Affordable Housing Dev Fund	$ 1,300,000
Seller Note	$ 997,797
Bayview Foundation Loan	$ -
Deferred Developer Fee	$ 2,950,000
Managing Member Equity	$ 100
Federal Tax Credit Equity	$ 16,474,752
State Tax Credit Equity	$ 5,995,436
	$ 46,348,710

Uses of Funds	
Land Acquisition	$ 2,040,000
Demolition	$ 150,000
Construction hard costs	$ 26,871,586
Community Center	$ 5,168,414
Hard Cost Contingency (5% of hard costs)	$ 1,609,500
Soft Costs Excluding Developer Fee	$ 3,092,951
Developer Fee	$ 5,900,000
Financing and Reserves	$ 1,516,259
	$ 46,348,710

DECLARATION OF CONDITIONS, COVENANTS AND RESTRICTIONS FOR MAINTENANCE OF STORMWATER MANAGEMENT MEASURES

This space is reserved for recording data

Return to:

City Engineering Division
Rm. 115, City-County Building
Madison, Wisconsin

Tax Parcel No.: 251/0810-332-0902-5

RECITALS:

A. Bayview Foundation, Inc. is the owner of 601 Bay View, Madison, WI 53715, more particularly described on Exhibit A attached hereto ("Property").

B. Owner desires to construct townhome buildings and parking facilities on the Property in accordance with certain plans and specifications approved by the City.

C. The City requires Owner to record this Declaration regarding maintenance of stormwater management measures to be located on the Property. Owner agrees to maintain the stormwater management measures and to grant to the City the rights set forth below.

NOW, THEREFORE, in consideration of the declarations herein and other good and valuable consideration, the receipt and sufficiency of which are hereby acknowledged, the owner agrees as follows:

1. Maintenance. Owner and its successors and assigns shall be responsible to repair and maintain the stormwater management measures located on the Property in good condition and in working order and such that the measures comply with the approved plans on file with the City Engineer. Said maintenance shall be at the Owner's sole cost and expense. Owner will conduct such maintenance or repair work in accordance with all applicable laws, codes, regulations, and similar requirements, and pursuant to the Maintenance Provisions attached hereto as Exhibit B.

2. Easement to City. If Owner fails to maintain the stormwater management measures as required in Section 1, then City shall have the right, after providing Owner with written notice of the maintenance issue ("Maintenance Notice") and thirty (30) days to comply with the City's maintenance request, to enter the Property in order to conduct the maintenance specified in the Maintenance Notice. City will conduct such maintenance work in accordance with all applicable laws, codes, regulations, and similar requirements and will not unreasonably interfere with Owner's use of the Property. All costs and expenses incurred by the City in conducting such maintenance may be charged to the Owner of the Property by placing the amount on the tax roll for the Property as a special charge in accordance with Section 66.0627, Wis. Stats. and Section 4.09 of the Madison General Ordinances.

3. Term/Termination. The term of this Agreement shall commence on the date that this Agreement is filed of record with the Register of Deeds Office for Dane County, Wisconsin, and except as otherwise herein specifically provided, shall continue in perpetuity. Notwithstanding the foregoing, this Agreement may be terminated by recording with the Register of Deeds Office for Dane County, Wisconsin, a written instrument of termination signed by the City and all of the then-owners of the Property.

4. Miscellaneous.

(a) Notices. Any notice, request or demand required or permitted under this Agreement shall be in writing and shall be deemed given when personally served or three (3) days after the same has been deposited with the United States Post Office, registered or certified mail, return receipt requested, postage prepaid and addressed as follows:

If to Owner: Bayview Foundation
601 Bay View.
Madison, WI 53715

If to City: City Engineering Division
Room 115, City County Building
210 Martin Luther King Jr. Blvd.
Madison, WI 53703-3342
Attention: City Engineer

Any party may change its address for the receipt of notice by written notice to the other.

(b) Governing Law. This Agreement shall be governed and construed in accordance with the laws of the State of Wisconsin.

(c) Amendments or Further Agreements to be in Writing. This Agreement may not be modified in whole or in part unless such agreement is in writing and signed by all parties bound hereby.

(d) Covenants Running with the Land. All of the easements, restrictions, covenants and agreements set forth in this Agreement are intended to be and shall be construed as covenants running with the land, binding upon, inuring to the benefit of, and enforceable by the parties hereto and their respective successors and assigns.

(e) Partial Invalidity. If any provisions, or portions thereof, of this Agreement or the application thereof to any person or circumstance shall, to any extent, be invalid or unenforceable, the remainder of this Agreement, or the application of such provision, or portion thereof, to any other persons or circumstances shall not be affected thereby and each provision of this Agreement shall be valid and enforceable to the fullest extent permitted by law.

IN WITNESS WHEREOF, we have hereunto set our hands and seals this _____ day of _____, 20_____.

_____ _____

STATE OF WISCONSIN)
COUNTY OF DANE) SS

Personally came before me this _____ day of _____, 20_____, the above named _____, to me known to be the person(s) who executed the foregoing instrument and acknowledged the same.

_____
NOTARY PUBLIC

My Commission Expires:_____

Drafted by: City Engineering Division
Rm. 115, City-County Building
Madison, Wisconsin

EXHIBIT A

Parcel Description

Parcel Number - 251/0709-233-0101-7

TRIANGLE PLAT - A REPLAT OF PARTS OF GREENBUSH ADDITION, PREGLERS ADDITION FABERS SUBD. AND MURPHYS REPLAT EXC PRT USED FOR HWY ROW RECORDED IN VOL 18621 PAGE 32. LOT 3, BLOCK 3CITY OF MADISON, DANE COUNTY, WISCONSIN.

Parcel Map

EXHIBIT B

Specific Maintenance Requirements for
Detention Pond and Storm Sewers

Maintenance Provisions:

An initial installation certification (as-built) stamped by a P.E. registered in the state of Wisconsin shall be submitted to the City Engineer upon completion of construction. The as-built shall be of sufficient detail to show the system is functioning as designed.

Permeable Paver Facilities:

- The Owner shall maintain al components of the permeable pavers system located onsite.
- Remove all litter and debris monthly.
- Inspection of the permeable pavement system shall be conducted at least once per year to evaluate the following:
    - Pavement condition- Inspect permeable pavement surfaces for settlement, deformation or cracking.
    - Surface infiltration- Inspect permeable pavement surfaces for sedimentation or evidence of ponding.
    - Drainage- Inspect observation wells 72 hours after a rain event of 0.5 inches or greater to verify that the aggregate storage reservoir is draining down effectively.
- Maintenance shall be required when the system shows standing water within the observation wells beyond the 72 hours after a rain event.
- Clean the pavement surface using industry recommended methods, such as regenerative air or vacuum sweeping at least twice per year in accordance with WDNR technical Standard 1008.
- Repair any settlement, deformation or cracking that are significant enough to adversely impact the water quality function of the system.
- Repair blocked, retrict4ed, or eroding underdrain outfalls.
- Sediment deposits shall be removed, and disturbed drainage aggregate shall be replaced.
- For permeable pavement with joints filled with aggregate
    - Replenish the joint aggregate in accordance with industry recommendations.
    - If necessary, remediate the system by extracting accumulated debris and aggregate from the joints using vacuum and refill the joints with new aggregate.
- If the pavement surface infiltration rate is questionable at any time during the effective life of the pavement, the administering authority may require infiltration testing to verify that the surface infiltration rate is no lower than 10 in/hr. If the surface infiltration rate is lower than 10 in/hr, appropriate action shall be taken to restore the infiltration rate to acceptable level based on the remaining effective life of the pavement.
- Owner shall maintain records of inspection, cleaning and replacement of the permeable paver system in accordance with chapter 37 of the Madison general ordinances.
- The following activities shall be prohibited from occurring on the permeable pavement surfaces:
    - Temporary or permanent stockpiling of soil or other material that can potentially cause or contribute to clogging.
    - Application of pavement seal coating.
    - Application of sand for deicing.

Storm Sewer System:

- The owner shall maintain all components of the storm sewer system located onsite.
- Installation and maintenance shall be in accordance with the manufacturer's guidelines. Any alterations to the approved storm sewer shall be approved by the City Engineer.
- At a minimum, the storm sewer system shall be inspected annually and cleaned as needed to maintain design capacity.
- Owner shall maintain records of inspections, cleaning and replacement of the storm sewer system all in accordance with Chapter 37 of the Madison General Ordinances.

Oil and Grease Insert System:

- The Owner shall install and maintain a 2' x 3' (frame mount) Flo-Gard "Plus" (High Capacity) Catch Basin Insert as distributed by Kristar or Catch-All inlet filters by Mar-Mac Manufacturing Co. or FlexStorm inlet filters by ADS or equal.
- Insert is installed for mitigation and control of sediment and/or oil and grease in the stormwater runoff.
- Installation and maintenance shall be in accordance with the manufacturer's guidelines, which, at minimum shall be three (3) inspections per year, two (2) cleanings per year and one (1) filter replacement per year.
- Debris shall be removed and filter medium is to be replaced any time the filter medium appears to be 50% coated with oil or grease.
- Owner shall maintain records of inspections, cleaning and replacement of the device or components of the device all in accordance with Chapter 37 of the Madison General Ordinances.

Monona Bay Neighborhood Association

Alexis London, Executive Director
Bayview Foundation
Via email <alexislondon@bayviewfoundation.org>

Dear Alexis:

The Monona Bay Neighborhood Association (MBNA) includes the Bayview community within its borders. In 2018, the MBNA formally adopted a ten-year Community Revitalization Plan. This plan addresses a variety of issues and, because our neighborhood has experienced significant, repeated flooding, includes this goal:

Improve water quality in the bay and harden the neighborhood against flooding.

The MBNA, therefore, strongly supports the Bayview Foundation's application to the Dane County Water Quality grant program. The comprehensive storm water management plan, from green roof and water collection system above through the native landscaping and permeable pavers at ground level to the cistern below, promises a model of the kind of best water management practices the MNBA's plan specifically encourages.

Because your storm water management plan has been developed in a manner that fully integrates it with other green building practices including passive construction principles, it is especially important. Once completed, this entire redevelopment will stand as Dane County's most environmentally responsible affordable housing community. MBNA is proud to endorse these efforts and to encourage Dane County to award this grant.

Sincerely,

Tom Wilson, President
Monona Bay Neighborhood Association
tlwilson1986@gmail.com