



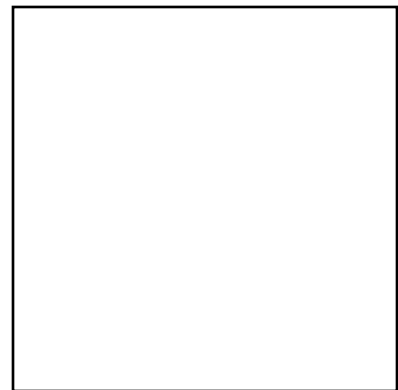
# STORMWATER MANAGEMENT REPORT

WATERFORD CENTRAL APARTMENTS  
61 & 61A MYROCK AVENUE EXT  
WATERFORD, CT

PREPARED FOR

SIG CON ASSOCIATES, LLC  
606 POST ROAD EAST #320  
WESTPORT, CT 06880

DATE: MARCH 20, 2023  
REVISED:







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## PROJECT DESCRIPTION

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Sig Con Associates, LLC is proposing Waterford Central Apartments, a residential multi-family development on two parcels of land. 61 & 61A Myrock Avenue total 27.62 acres and are located to the south of Willetts Avenue Ext. and west of Myrock Avenue. The parcels are identified as Lots 5002 and 5005 on the Waterford Tax Assessors Map 140. The combined parcels are hereinafter referred to as the Site.

The Site is in the Commercial Multi-Family District (C-MF). Per Section 16.1.2 of the Zoning Regulations multi-family developments are listed as a permitted use within the district, which requires a Site Plan approval per Section 18.1.a.

The new development will consist of the construction of six (6) apartment buildings with a total of 216 units and a mix of 144 one-bedroom and 72 two-bedroom dwelling units. Main access to the new development will utilize the existing driveway constructed as part of the Waterford Woods multi-family development on the adjacent parcel at 394 Willetts Avenue Extension. The full site development will include:

- Clearing and grubbing of brush
- Construction of Buildings G, H, I, J, K, and L with an additional 216 residential units.
- Construction of 24' wide internal access drives with looped intersection to the existing driveway network serving the adjacent Waterford Woods development on 394 Willetts Avenue Extension.
- Outdoor recreation areas including community spaces.
- Parking situated near the apartment buildings and site amenities with a total of 325 spaces, including 8 handicapped accessible.
- Minor road widening with additional northbound lane at intersection of Willetts Avenue with Boston Post Road.
- Concrete pedestrian sidewalks connecting the apartment buildings to the adjacent parking areas and amenities.
- Drainage improvements including a stormwater collection network, treatment, recharge, and attenuation.
- Extension of private water, sewer, electric, gas and telecom mains.
- Landscaping including a mixture of street trees, shrubs, foundation plantings and planting beds.
- Front and side yard screening and buffers.
- Building and street lighting.
- Erosion and sedimentation control measures.

To support the new site plan application for Waterford Central Apartments, the following stormwater management report was prepared by a professional engineer and provides a comprehensive evaluation of the fully developed Site. The report concludes that there will be zero net increase in peak flow rates discharging to downgradient wetlands or private properties, general drainage patterns will be maintained, and stormwater will be treated in accordance with the CT DEEP 2004 Stormwater Quality Manual.



## EXISTING SITE DESCRIPTION

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The subject Site is a partially developed commercial site with the former Atlantic Broadband building and site improvements located at the southeast corner with access from Myrock Avenue. The land to the south of the commercial development pad consists of wooded and wetland areas, which will not be disturbed as part of the development. The land to the east and north of the commercial pad consist of shrub and brush growth over historically disturbed areas, with visible evidence of stripping, stockpiling, and landfilling. The new development has been sited within the historically disturbed areas while the existing commercial development will remain.

**TOPOGRAPHY** – The existing topography generally consists of gentle to moderately sloping terrain from the northeast corner along Willetts Avenue to the southwest toward inland wetland areas. Existing slopes within the upland development area range from 5% to 10% with steeper slopes along the westerly boundary.

**SOILS** – The USDA NRCS Web Soil Survey indicates that the upland area of the Site contains Udorthents – Urban Land Complex (306) soils, which have a hydrologic soil group classification (HSG) of B. This classification correlates with the limits of the historical land disturbance activities visible on the site. Deep observation test holes were performed at the site, which generally confirmed the NRCS soil types within upland areas. Inland wetland areas are designed as Ridgebury, Leicester, and Whitman and Tamakwa and Natchaug which have an HSG of D.

**DRAINAGE** – The Site drains from the northeast along Willetts Avenue towards wetland systems to the south and southwest. One (1) existing drainage area was delineated based upon topography and field observation terminating at the delineated limit of the wetlands.

- **SITE-EX-01** is 21.882 acres and consists of the portions of the site to the north of the wetland delineation.

Based upon CTDEEP mapping, the entire Site lies within the Southeast Shoreline subregional drainage basin 2000, which is part of the Southeast Coast major basin 2. However, based upon the “Jordan Brook Watershed Management Plan Final Report, Town of Waterford, Connecticut”, dated February 2000, prepared by Fuss & O’Neill, Inc., the Site is included within the Jordan Brook subregional basin 2201 (hereinafter JBWMP). A detailed review of the hydrologic conditions of the subregional watershed was not performed as part of this review; however, the recommendations of the JBWMP were followed as a conservative measure.

## PEAK FLOW CONTROL & FLOOD PROTECTION

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Stormwater runoff from the proposed multi-family development will be collected through a series of rain gardens, swales, yard drains, catch basins, and drainage piping and discharged to a series of treatment, retention, and detention areas on the Site.

Peak flow rates for pre-development and post-development conditions were calculated using SCS TR-55 methodology. Hydrology Studio 2022 v.3.0.0.27 was used to generate peak flows from the watershed with the following parameters:

### PRE-DEVELOPED CONDITIONS (Drainage Area Map DA-01A)

- **DRAINAGE AREAS:** As described above, the Site has one (1) existing drainage area.



- SITE-EX-01 is 21.882 acres and consists of the portion of the site to the north of the wetland delineation.
- **RAINFALL:** Precipitation frequency and depth estimates (rainfall data) were obtained from NOAA Atlas 14, Volume 10, Version 2 at Lat. 41.3376 Long. -72.1163, which corresponds with the geographic location of the Site.
- **RUNOFF COEFFICIENT:** Composite Curve Numbers (CN) were calculated based on the land cover types for the site for HSG B. Land cover types consist of impervious buildings and pavement, meadow/brush, open space vegetated areas, woods, and wetlands. Wetland areas were excluded from the drainage areas and calculations.
- **TIME OF CONCENTRATION:** Time of concentration (Tc) was estimated for the basin based on the SCS method, with sheet and shallow concentrated flow from the hydraulically most distant point of the watershed to the discharge point.

POST-DEVELOPED CONDITIONS (Drainage Area Map DA-02A)

- **DRAINAGE AREA:** For direct comparison with existing conditions, the same design point was evaluated.
  - SITE-PR-01 is 21.882 acres and consists of the portion of the site to the north of the wetland delineation, including the new multi-family development areas.
- **RAINFALL:** Same as Pre-Developed Conditions.
- **CURVE NUMBER:** Same methodology as Pre-Developed Conditions. Composite Curve Numbers (CN) were calculated based on the land cover types for the proposed multi-family residential development for HSG B.
- **TIME OF CONCENTRATION:** Same methodology as Pre-Developed Conditions.

COMPARISON

A summary of flows for existing and proposed conditions, without consideration of detention is provided below with a complete output provided in the enclosed Hydrology Studio Report.

STORM EVENT	AREA 01		
	SITE-EX-01	SITE-PR-01	EX vs. PR
2-yr	4.34	12.46	8.12
5-yr	9.80	21.18	11.38
10-yr	15.31	29.10	13.79
25-yr	24.02	40.85	16.83
50-yr	30.99	49.85	18.86
100-yr	38.92	59.79	20.87

TABLE 1: PEAK FLOW COMPARISON - NO DETENTION



As shown in the table above, the proposed multi-family development (SITE-PR) results in an increase in peak flow rates as compared to existing conditions (SITE-EX) without consideration of detention. To attenuate peak flow rates, a single detention pond is proposed, which will collect runoff from the collection network and attenuate peak flow rates and volumes. Further discussion is provided below.

DETENTION (Drainage Area Map DA-03A)

The proposed stormwater network consists of a series of treatment and detention methods to attenuate peak flow rates.

**PROPOSED AREA 01A (SITE-PR-01A)**

Stormwater runoff within PR-01A will discharge to the following:

- POND-04A – Wet detention pond used for peak runoff attenuation with a deep wet pool, sediment forebay and filter bed to promote treatment and infiltration from contributing area. This area will discharge through outlet control structure 04A (OCS 04A) with staged outlets to regulate outflow, an emergency overflow weir, and riprap plunge pool to dissipate energy and velocity before flowing towards the downstream wetlands.

The wet detention pond has been sized to attenuate peak flow rates as compared to pre-development conditions for the 2-, 5-, 10-, 25-, 50-, and 100-year storm events.

STORM EVENT	AREA 01		
	SITE-EX-01	SITE-PR-01-2	EX vs. PR
2-yr	4.34	4.13	-0.21
5-yr	9.80	9.84	0.04
10-yr	15.31	15.22	-0.09
25-yr	24.02	23.22	-0.80
50-yr	30.99	30.99	0.00
100-yr	38.92	38.03	-0.89

TABLE 2: PEAK FLOW COMPARISON - WITH DETENTION

As shown in Table 2 above, incorporation of the detention system into the proposed development results in a minor decrease or balance of peak flow rates as compared to existing conditions for the entire Site. The plan provides for zero net increase in peak flow rates for all storms up to the 100-year event.

**STORMWATER QUALITY & TREATMENT**

The proposed development has been designed to reduce stormwater runoff and pollutant loads to the maximum extent possible and to treat the required water quality volume and flow per the CTDEEP 2004 Stormwater Quality Manual (2004 DEEP Manual). The proposed measures incorporated into the plan include:

- Maximize conservation and preservation of natural features: Impervious surfaces and buildings fall within historic limits of site disturbance activities. There are no features warranting preservation within the development footprint.





- Minimize clearing and grubbing maintain native vegetation on site: There is no clearing of the mature tree vegetation to the south. All existing vegetation within 100’ of the delineated inland wetlands will be preserved exceeding the recommendations in the JBWMP.
- Minimize building footprint: Buildings have been designed to accommodate site grades and unit areas were condensed to maximize the number of units in a limited footprint area.
- Minimize impervious surfaces for roadways and parking: Curb cuts and access drives are the minimum required for adequate site access and the proposed parking quantity has been reduced to the minimum allowed per zoning requirements. Impervious area totals 23% of the total site, which is on the low end of the 18% to 30% impervious cover referenced in Section 3.1.2.3 of the JBWMP for “intermediate” level uses such as multi-family. **The impervious totals include the existing commercial development.**
- Disconnect impervious areas where possible, such as sidewalks: Disconnected impervious areas were not subtracted from the treatment calculations as a conservative measure.
- Collect, treat, and infiltrate to encourage groundwater recharge including the incorporation of base level and secondary controls to improve water quality as recommended by the JBWMP.

WATER QUALITY VOLUME & FLOW (Drainage Area Map DA-03A)

Water quality volumes and flows were calculated for all proposed impervious surfaces for the driveway, parking and building areas in accordance with the 2004 DEEP Manual.

AREA	DA	IA	WQV	WQF	WQF	PROPOSED TREATMENT				
Label	acre	acre	acre-ft	cfs	sf	Method	Vol	Flow	Area	Note
POND 04A	13.289	5.264	0.450	3.630	2400	Sediment Forebay	0.06	N/A	N/A	14% WQV
POND 04A	13.289	5.264	0.450	3.630	2400	Filter Bed	N/A	N/A	4300	180% WQF
POND 04A	13.289	5.264	0.450	3.630	2400	Forebay Retention	0.56	N/A	N/A	125% WQV

**TABLE 3: PROPOSED TREATMENT SUMMARY**

1. Rain Garden Volume not included in treatment calculations

As shown in Table 3 above, the proposed treatment measures will adequately retain the calculated water quality volume and/or treat the calculated water quality flow, removing 80% or more of total suspended solids and floatable debris for the first inch of rainfall before discharging to the Site wetlands

GROUNDWATER RECHARGE VOLUME

Existing non-wetland soils are classified as Udorthents-Urban Land complex (HSG B) and the wetland soils as Ridgebury, Leicester, and Whitman and Tamakwa and Natchaug (HSG D). Required Groundwater Recharge Volumes (GRV) were calculated in accordance with 2004 DEEP Manual based upon the area of each Hydrologic Soil Group.

GRV (required) = 0.072 acre-feet  
 GRV (provided) = 0.356 acre-feet

The combination of rain gardens, sediment areas, and filter beds provide adequate capacity to fully retain over 4 times the recommended groundwater recharge volume, thereby exceeding the GRV requirement.



## CONCLUSION

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There will be no increase in peak flow rates discharging to the downgradient wetlands or adjacent properties. The stormwater network will maintain approved drainage patterns and utilize a combination of treatment and detention to regulate any increase in run-off on site. Stormwater will be treated in accordance with the CTDEEP 2004 Stormwater Quality Manual.

No adverse impacts to the site, adjacent wetlands, or municipal systems are anticipated.