HYDROLOGY

H16/D1
1 PLAN
NO DOCUMENTS

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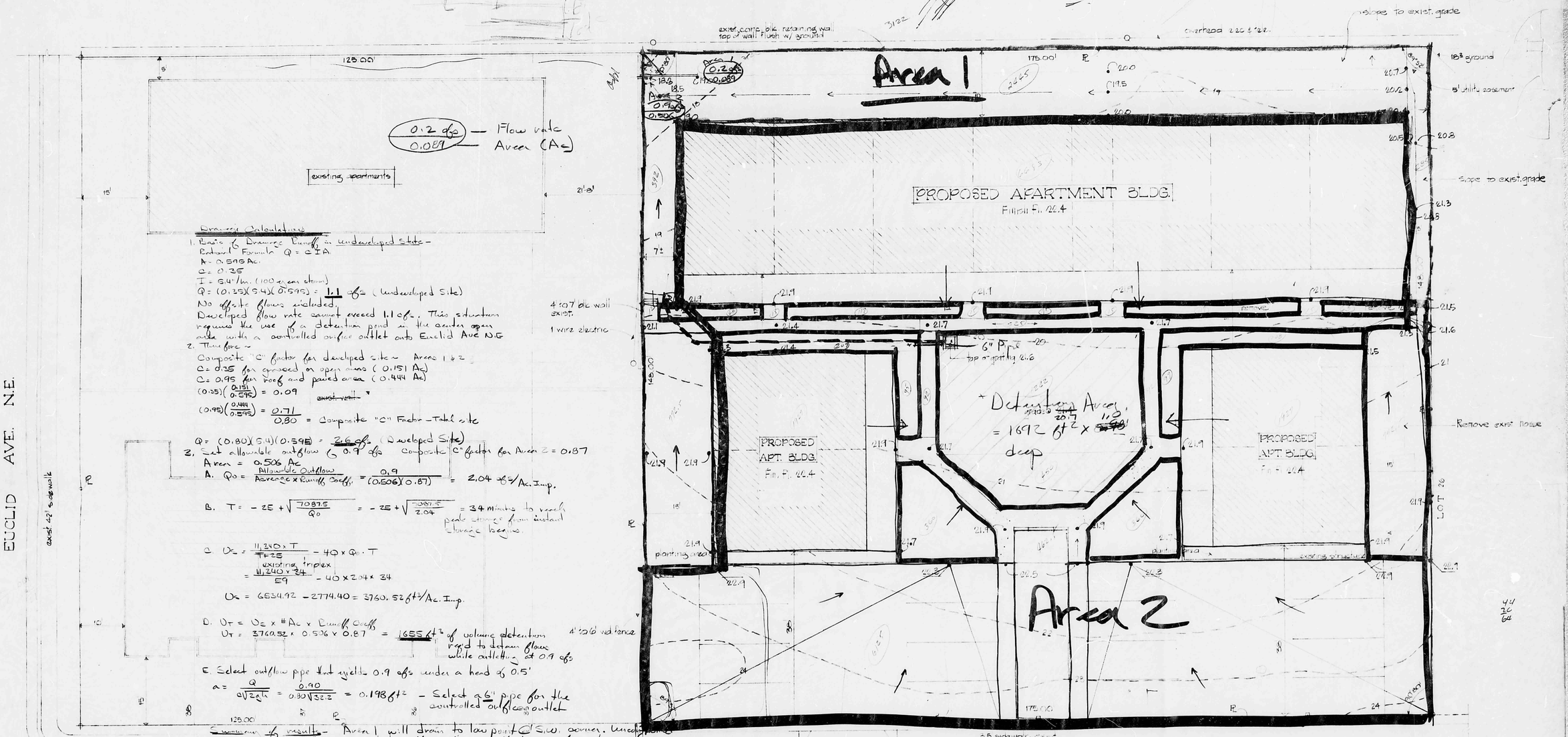


Drainage Calculations

1. Rate of Drainage Runoff in undeveloped state –
Rational Formula $Q = CIA$
$A = 0.595$ Ac.
$C = 0.25$
$I = 5.4$"/hr. (100 year storm)
$Q = (0.25)(5.4)(0.595) = \underline{1.1}$ cfs (Undeveloped Site)
No offsite flows included.
Developed flow rate cannot exceed 1.1 cfs. This situation requires the use of a detention pond in the center open area with a controlled orifice outlet onto Euclid Ave N.E.

2. Therefore –
Composite "C" factor for developed site – Areas 1 & 2
$C = 0.25$ for grassed or open areas (0.151 Ac)
$C = 0.95$ for roof and paved areas (0.444 Ac)
$(0.25)\left(\frac{0.151}{0.595}\right) = 0.09$
$(0.95)\left(\frac{0.444}{0.595}\right) = \frac{0.71}{0.80}$ = Composite "C" Factor – Total site

$Q = (0.80)(5.4)(0.595) = \underline{2.6 \text{ cfs}}$ (Developed Site)

3. Set allowable outflow @ 0.9 cfs Composite "C" factor for Area 2 = 0.87
Area = 0.506 Ac

A. $Q_o = \frac{\text{Allowable Outflow}}{\text{Acreage} \times \text{Runoff Coeff.}} = \frac{0.9}{(0.506)(0.87)} = 2.04$ cfs/Ac. Imp.

B. $T = -25 + \sqrt{\frac{70875}{Q_o}} = -25 + \sqrt{\frac{70875}{2.04}} = 34$ minutes to reach peak storage from instant storage begins.

C. $U_E = \frac{11{,}240 \times T}{T+25} - 40 \times Q_o \cdot T$
existing triplex
$= \frac{11{,}240 \times 34}{59} - 40 \times 2.04 \times 34$

$U_E = 6534.92 - 2774.40 = 3760.52$ ft³/Ac. Imp.

D. $U_T = U_E \times \#Ac \times \text{Runoff Coeff.}$
$U_T = 3760.52 \times 0.506 \times 0.87 = \underline{1655 \text{ ft}^3}$ of volume detention reqd to detain flows while outletting at 0.9 cfs

E. Select outflow pipe that yields 0.9 cfs under a head of 0.5'
$a = \frac{Q}{a\sqrt{2gh}} = \frac{0.90}{0.80\sqrt{32.2}} = 0.198 \text{ ft}^2$ – Select a 6" pipe for the controlled outflow outlet

Conclusion of results – Area 1 will drain to low point @ S.W. corner. Uncontrolled runoff ≈ 0.2 cfs. Area 2 includes all remaining runoff from roofs, parking and open spaces. These flows will be released thru a controlled orifice at the rate of 0.9 cfs. Total flows leaving at the S.W. corner is 1.1 cfs. This flow will cross the property of exist. Carlo Stero owners of the proposed site before emptying onto Euclid Ave N.E.

LEGEND

| | |
|---|---|
| ○ | 5/8" rebar by Hyrez survey co |
| ● | nail in conc blk wall |
| ◯ | sanitary sewer manhole |
| ○ | poz |
| □ | water meter |
| ○ | water valve |
| ▢ | elm tree |
| tc | top of curb |

LEGAL DESCRIPTION

lots 27 thru 33, block 21
netherwood park addition

N ⇨

SITE PLAN 1"=10'-0"

MILES BRITTELLE AIA ARCHITECT
APARTMENTS for MR. & MRS. CARLO STERO
Sheet 1 of 7