SITE CLOSURE PLAN

FOR

DUNKIRK SANITARY LANDFILL

CHAUTAUQUA COUNTY, NEW YORK

PEC NO. 200R

prepared for

Department of Public Works
Chautauqua County, New York

prepared by

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200R-C-01	Existing Conditions
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1.0 INTRODUCTION

This report and accompanying drawings have been prepared at the request of Mr. William Parment, Director of Chautauqua County Department of Public Works, to provide a final closure plan for the Dunkirk sanitary landfill. Revisions have been made in response to correspondence from the New York State Department of Environmental Conservation (NYSDEC) dated October 30, 1978, concerning an earlier plan submitted during August of 1978.

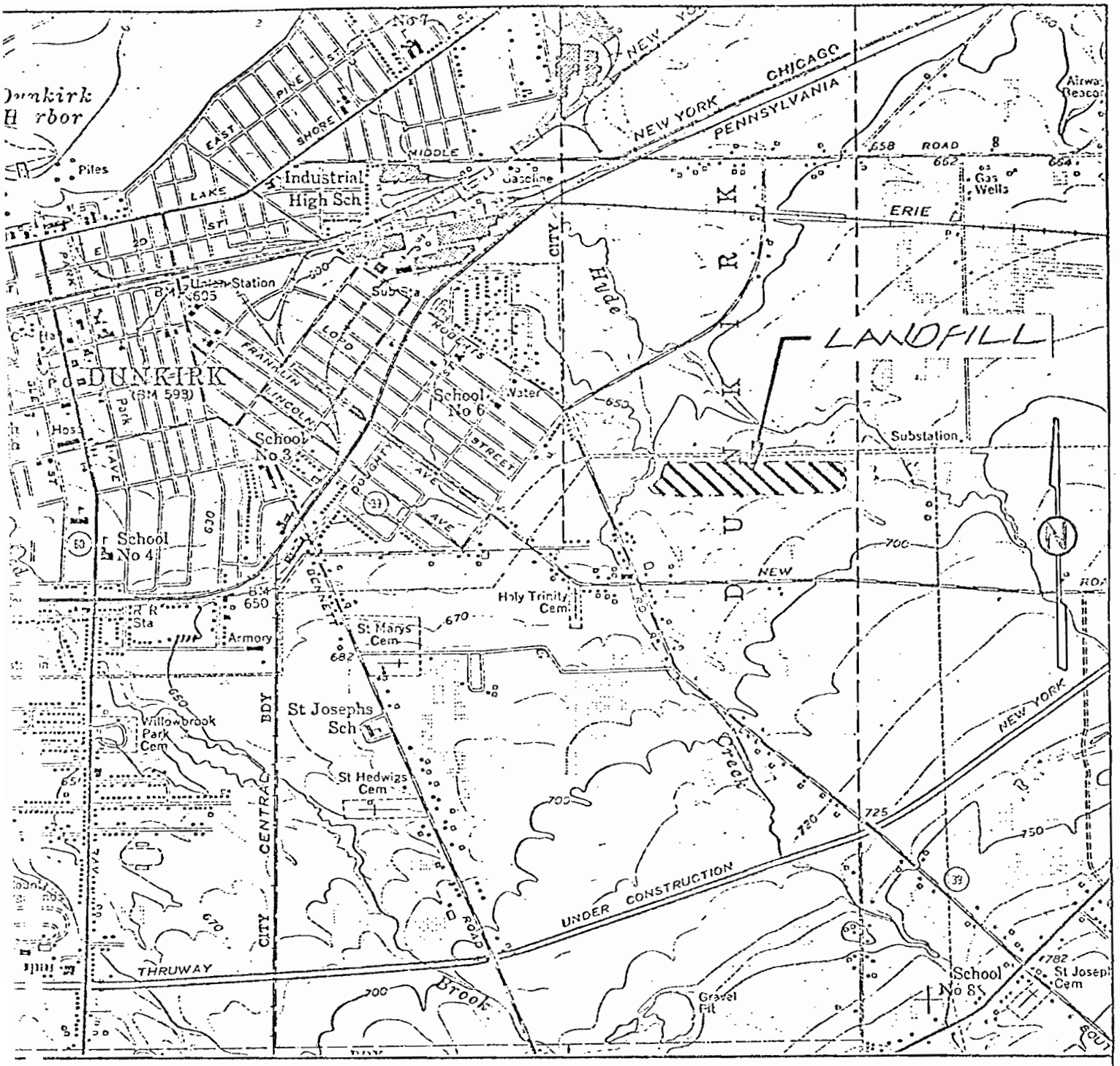
This report is intended for use by those responsible for and those that will carry out the closure, maintenance, and monitoring of the Dunkirk landfill.

The plan was developed within the guidelines of New York State Department of Environmental Conservation Rules and Regulations, Part 360, Solid Waste Management Facilities, May 7, 1977. Environmental control features, such as surface water diversions, were designed using accepted engineering practices. Assistance with final vegetation selection was provided by the Soil Conservation Service, Jamestown and Syracuse offices.

2.0 SITE DESCRIPTION

The landfill is located on an approximately 27 acre tract of land within the Town of Dunkirk. The land is owned by the City of Dunkirk, and leased on a yearly basis by the county. See Figure 2-1 for the location of the site on the U.S.G.S. topographic map, Dunkirk, New York. The center of the site, as measured from the northeast corner of the Dunkirk quadrangle, is 4 inches to the south and 6.7 inches to the west.

Access to the area is by a haul route intersecting South Roberts Road, 1,800 feet north of the intersection of South Roberts and New Roads.



NOTE: REPRODUCED FROM U.S.G.S. 7.5 MINUTE SERIES MAP. DUNKIRK, NEW YORK QUADRANGLE.

1/2 1 MILE

SCALE 1" = 2000'

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DRAWN	DATE	SCALE
BC	8-12	SHOWN

FIG. 2-1

CLOSURE PLAN
DUNKIRK SANITARY LANDFILL
CHAUTAUQUA COUNTY, N.Y.
SITE LOCATION MAP

3.0 CLOSURE PROCEDURE

Final grades, cover type and placement, and surface water drainage structures are designed to prevent ponding and erosion and to minimize infiltration of water into the solid waste cells.

Design features, if implemented with a responsible construction and maintenance program, will provide significant environmental upgrading of the landfill at an economical cost.

3.1 Site Drainage

Surface runoff from the site and from upland areas flowing to the site will be collected and conveyed to Hyde Creek, the main drainageway in the area, approximately 100 feet directly west of the landfill.

Two (2) main perimeter diversion channels will be provided along the toe of the landfill side slope. These channels will flow from east to west at an average slope of 2 percent. Design flow rates were calculated at 18.7 cfs for a 50-year storm. The channels will have identical trapezoidal cross sections, as depicted on Detail 1, Drawing 200R-C-03. See Appendix A, Design Calculations. Grass linings will be provided to prevent excessive erosion of side slopes and bottom. Side slopes were selected at 3 horizontal to 1 vertical because of the erodible nature of the in-place materials and the importance of establishing a hardy vegetative cover. Seeding mixtures and soil amendment procedures are similar to those used for the final cover. These are contained in Section 3.3, Vegetation.

Where the northern diversion channel approaches the access road, a headwall and culvert structure is required. See Detail 2, Drawing 200R-C-03. Two (2) 24-inch diameter asphalt coated corrugated metal pipes, sloped at 2 percent, shall be provided to convey the peak design flow of 18.7 cfs. A 6-inch thick by 3 feet high by 10 feet long reinforced concrete headwall is provided on the inlet and outlet of the pipe. Riprap approach and discharge aprons are required to dissipate erosive energy at the inlet and outlet transitions.

3.2 Final Cover

The remaining bulky waste will be hauled away to the transfer station and then to the Chautauqua Landfill for disposal. Rough grading may be necessary to smooth the landfill surface and side slopes to achieve a uniform surface in accordance with the final contour map. See Drawing 200R-C-02. Erosion rills, gullies, and depressions should be filled or graded over. The surface of the fill will be crowned along the center line, and sloped to the outer crests at a minimum of 2 percent. Side slopes shall be maintained at 33 percent (3:1) or flatter. Existing side slopes average 3:1 as is, so excessive filling will not be required here.

After regrading is complete, a uniform 2 foot blanket of cover material should be applied on the top and sides of the landfill. The top 6 inches of which shall be organic or A-horizon type soils. To maintain a low permeability surface, the lowest 1 foot 6 inches of the cover material should be fine grained, compactable, and not susceptible to excessive

cracking when dry. Typical grain size of d_{50} (50 percent finer) equal to No. 200 sieve would be sufficient. The coarse fragment content (particles not passing the No. 10 mesh sieve, 2 mm.) shall not exceed 60 percent by volume, or d_{60} greater than No. 10 sieve. Most upland gray and brown tills fall into this category, as well as high clay content soils.

The final cover shall be applied in three (3) layers. The last or top layer being the loose-placed vegetation base.

The low permeability portion, about 1 foot 6 inches thick shall be applied in three (3) layers. The last or top layer being the loose-placed vegetation base.

The low permeability portion, about 1 foot 6 inches thick shall be applied in two (2) successive compacted lifts, 8 to 10 inches thick. Compaction shall achieve a minimum dry density of 90 percent optimum as recorded by Modified Proctor Tests on the selected cover material.

A suitable compactor shall be employed to achieve this density.

If the moisture content of the fill material is deficient, water shall be sprinkled on the surface of each 8 to 10 inch lift and thoroughly mixed before compaction. If the material is excessively moist, it shall not be used until it has air dried to the proper moisture content.

Approximately 25,000 cubic yards (in place) of vegetation base material and 75,000 cubic yards of fine grained material are required for the final cover.

3.3 Vegetation

The seeding mixture and method of establishment will apply to the final cover of the landfill and the inside slopes of the diversion channels. The landfill seeding mixture shall be applied immediately after the final cover is in place, and the channel mix immediately after the cross section is established. The recommended mix is:

Landfill	
KY-31 Tall Fescue	20 lb./acre
Perennial Ryegrass (Common)	5 lb./acre
Birdsfoot Trefoil (Empire or Viking)	8 lb./acre

Diversion Channels	
KY-31 Fescue	20 lb./acre
Perennial Ryegrass (Common)	5 lb./acre
Redtop	8 lb./acre

The sequence for establishing the vegetation shall be as follows: (1) apply 2 tons per acre of agricultural lime plus 400 pounds per acre of 5-10-10 or the equivalent; (2) work these materials into the soil surface with a drag and/or disc; (3) apply fescue and ryegrass seed, inoculate birdsfoot trefoil seed and sow separately; and (4) cover the entire seeded area with 2 tons per acre (92 lbs. per 1,000 square feet) of hay mulch.

If protection is needed to prevent mulch from being blown or washed away a plastic emulsion spray application will be made.

4.0 MAINTENANCE

Soil cover integrity, slopes, cover vegetation, and drainage structures shall undergo periodic maintenance. Routine field inspection and maintenance schedules will be established on a monthly basis for the first three (3) years and on a quarterly basis thereafter. Such schedules will aid in detecting areas requiring correction before conditions deteriorate to the point of extensive repair or even failure. Repairs and improvements shall be made, where needed, as soon as possible.

The following areas should be inspected on a regular schedule, reports filed, and maintenance performed, if required.

Watershed

Any changes or developments in the watershed area above the facility should be reported. This would include major changes in vegetation, commercial or industrial development, and waste disposal activities.

Slope Conditions

Landfill slopes should be checked for cracks, seeps, and slides or bulges at the toe. Any erosion or subsidence in the toe or flanks should be noted and corrected. Depressions resulting from the differential subsidence of the landfill should be filled and graded to prevent ponding and subsequent excess infiltration of water.

Channels

All diversion channels should have a uniform cross section and their condition should be in accordance with the original design. They should be

checked and cleaned of debris periodically. All eroded sections should be refilled and replanted as soon as possible. Accumulated silt should be removed to keep the channel open. Deterioration to riprap and outlet conveyances should be repaired immediately.

Vegetation

All seeded areas should have a well-developed vegetative cover. Any irregularities in color, density, the rate of or absence of growth should be noted. Bare areas should be fertilized, or replanted if the growth did not take. Erosion rills will need to be filled in immediately, graded, and replanted to prevent any damage to the abandoned site.

Rodent Control

The landfill has twice already been baited for rodents (by an outside firm). Future baiting will be in response to needs as determined by routine inspections and by notification given to the county from local residents or other observers.

Access

The gate at the landfill entrance has been repaired and is now sturdy. Only Niagra Mohawk and the Department of Public Works have keys to the gate.

Windblown Paper

Windblown paper has been collected and placed in the landfill. During routine inspections, observations will be made to determine if paper or other debris is blown from the landfill due to cover loss. All such debris

will be placed back into the landfill and the disturbed areas covered properly (see Section 3.2 on final cover).

Leachate and Gas

A final plan for handling leachate and gas generated at the Dunkirk Landfill will be completed and submitted to NYSDEC by August 1, 1980. During routine inspections prior to and after the plan is submitted, notice of any unusual discharge, in the form of leachate or gas, should be reported immediately to the Director of Public Works.

APPENDIX A

Design Calculations

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SUBJECT DUNKIRK S.L. SHEET No. 1 OF
200R BY MD DATE 8-2-78
DIVERSION CHANNELS CHKD P DATE 8-4-78

DIVERSION CHANNEL DESIGN

RUNOFF CALC. $Q = CiA$ ⇒

Q, PEAK FLOW, CFS
C, RUNOFF COEFFICIENT
i, RAINFALL INTENSITY, IN/HR.
A, WATERSHED AREA, ACRES

A.) WATERSHED AREA

SEE WORK SHT. 200R-C-01

AREA	SLOPE	COVER	ACRES	% TOTAL
LANDFILL	33%	FINAL COVER	13.0	66.6
"	2%	FINAL COVER	3.5	18.0
UPSLOPE	1-5%	GRASSED	3.0	15.4
			19.5 ACRES	

B) RUNOFF COEFFICIENT

REF: USEPA WATER BALANCE METHOD
EPA/530/SW-168 10/1975
TABLE 3. RUNOFF COEFFICIENTS.

AREA	SLOPE	COEFFICIENT
LANDFILL	33%	0.35
"	2%	0.22
UPSLOPE	1-5%	0.15

$$\text{AVG. COEFF} = \frac{0.35(66.6) + 0.22(18) + 0.15(5.4)}{100}$$

$$= 0.296 \cong 0.30$$

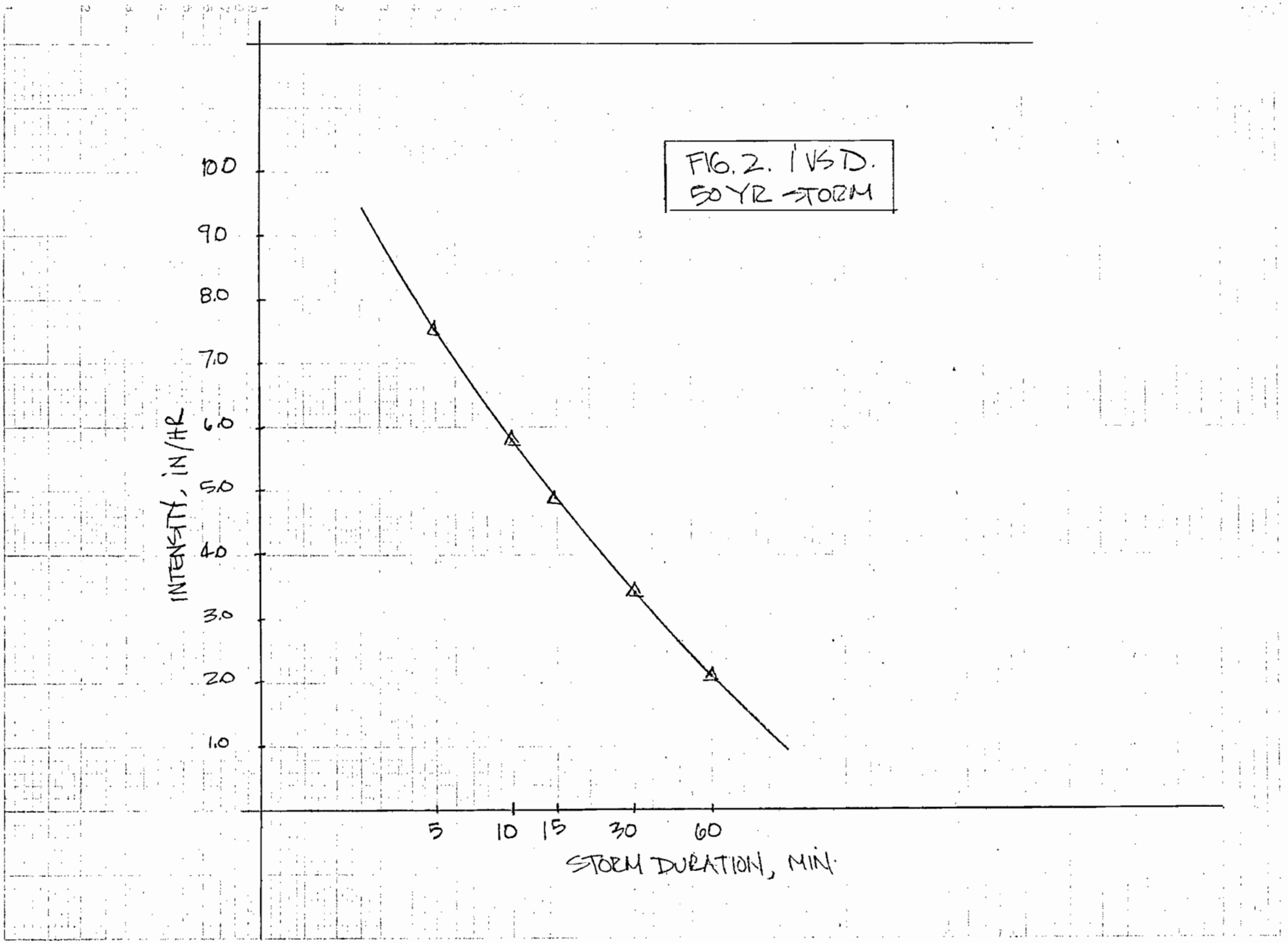
FIG. 2. I VS D.
50 YR - STORM
INTENSITY, IN/HR
10.0
9.0
8.0
7.0
6.0
5.0
4.0
3.0
2.0
1.0
5
10
15
30
60
STORM DURATION, MIN.

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SUBJECT DUNKIRK S.L. SHEET No. 2 OF
200R BY MD DATE 8-2-78
CHKD DATE 8-4-78

1. NORTHERN CHANNEL CONT

(C) RAINFALL INTENSITY

(1.) 50YR STORM ≠ INTENSITY-DURATION CURVE
REF: USWB TP-40, 1963 ; TABLE 3, PG. 5, FOR % OF 30 MIN RAIN

DURATION HR	DURATION MIN	% OF 30 MIN RAINFALL	RAINFALL INCHES	INTENSITY INCHES/HR.
1	60	—	2.1	2.1
1/2	30	100	1.7	3.4
1/4	15	72	1.22	4.88
-	10	57	0.97	5.82
-	5	37	0.63	7.56

SEE FIG 2 FOR iVSD, (ATTACHED)

(2) TIME OF CONCENTRATION, Tc. HRS

$$Tc = \left(\frac{11.9L^3}{H}\right)^{0.385} \times 2$$ (FOR GRASSED SURFACES.

WHERE L = LENGTH OF LONGEST WATERCOURSE, Mi
H = ELEV. DIFF., Ft

L = 3000' = 0.57 Mi
H ≈ 60'

$$\therefore Tc = \left(\frac{11.9(0.57)^3}{60}\right)^{0.385} \times 2 = 0.56 \text{ HRS} = 33.6 \text{ MIN}$$

∴ FROM FIG. 1, CORRESPONDING i FOR D = 33.6 = 3.2 IN/HR.

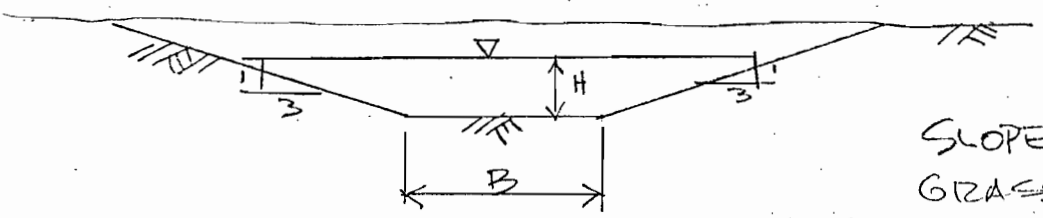
NORTHERN CHANNEL, CONT.

$Q = CiA = 0.3\,(3.2)\,19.5 = \underline{18.7\ CFS}$

CHANNEL DESIGN $\quad Q = \frac{1.49}{n} A R^{2/3} S^{1/2}$

(A) TRAPEZOIDAL SECTION, GRASS-LINED

REF: CHOW, V.T. OPEN CHANNEL HYDRAULICS. McGRAW-HILL, 1959



SLOPE = 2'/100' = 2%

GRASS: GRASS-LEGUME MIX (ORCHARD GRASS, REDTOP, ITALIAN RYE, COMMON LESPEDEZA)

(1) STABILITY, LOW VEGETATIVE RETARDANCE

(a) ASSUME $n = 0.1$ $\therefore$ FROM FIG 7-14 d, $VR = 0.25$

$VR = \frac{1.49 R^{5/3} S^{1/2}}{n} \Rightarrow$ FIND V_{MAX} FROM TABLE 7-6, SOLVE FOR R,

$V_{MAX} = 4$ FPS

TRIAL NO.	n	VR	R	$\frac{1.49 R^{5/3} S^{1/2}}{n}$
1	0.1	0.25	0.063	0.021
2	0.05	0.95	0.238	0.384
3	0.04	1.75	0.4375	1.32
4	0.035	3.0	0.75	3.73
5	0.0375	2.3	0.575	2.23

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SUBJECT DUNKIRK SHEET No. 1 OF
BY MD DATE 8-3-78
CHKD P DATE 8-4-78

CHANNEL DESIGN, CONT NORTHERN SECTION

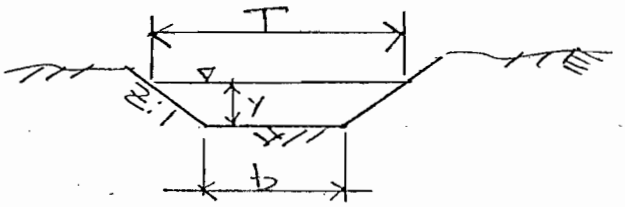
(b) TRAPEZOIDAL SECTION, STABILITY

$$\text{AREA} = \frac{Q}{V} = \frac{18.7}{4.0} = 4.68 \text{ □}$$

FOR Δ TRAP. SECTION

$$A = (b + zy)y$$

$$WP = b + 2\sqrt{1 + z^2}\,y$$



z	b'	A, □	y	T
3	4 ▲	4.68	0.76'	8.56'
3	5	4.68	0.66'	8.96'

(2) MAXIMUM CAPACITY, MODERATE VEG. RETARDANCE

(a) ASSUME y, FIND n FROM FIG 7-14-C

TRIAL NO.	y	A	R	V	VR	n	$V = \frac{1.49\,R^{2/3}S^{1/2}}{n}$
1.	1.0'	7 □	1.5	2.67	4.01	0.043	6.4
2.	0.8'	5.12 □	1.08	3.65	3.94	0.043	5.14
3.	0.7' ▲	4.27 □	0.89	4.38	3.90	0.043	4.52

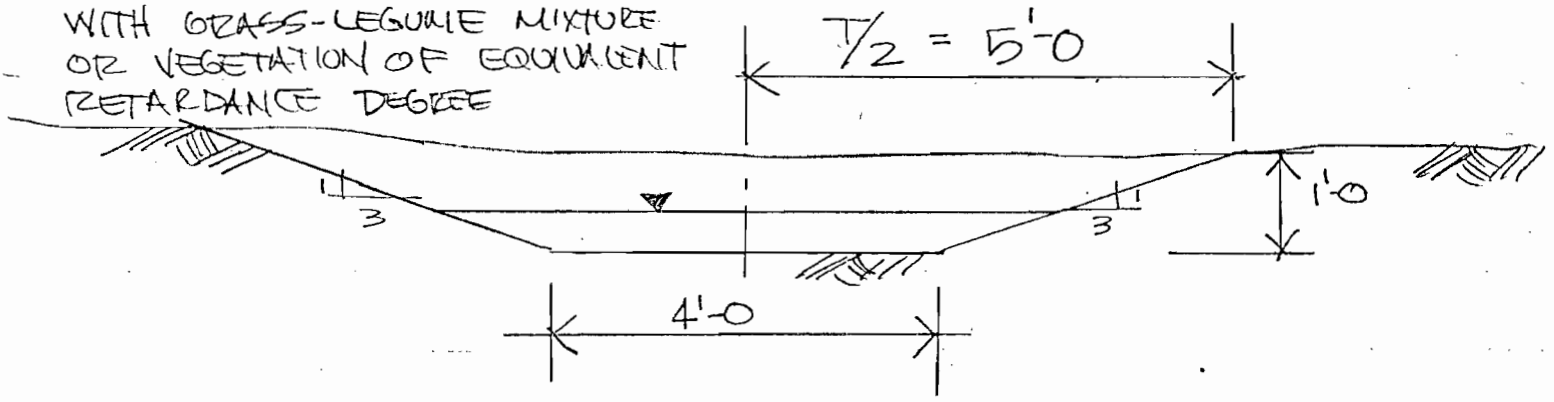
ADD 0.3' FREEBOARD, ∴ CORRECTED DEPTH = 0.7 + 0.3 =

1.0'

NORTHERN CHANNEL

TYP. SECTION
SCALE, 1" = 2'-0 H&V.

NOTE: CHANNEL CONTINUOSLY LINED WITH GRASS-LEGUME MIXTURE OR VEGETATION OF EQUIVALENT RETARDANCE DEGREE



2. SOUTHERN CHANNEL.

WATERSHED
SLOPE
RUNOFF COEFF } SAME AS NORTHERN CHANNEL
∴ USE SAME SECTION