

SANITARY COLLECTION FACILITIES
FOR
CANAL OVERLOOK
LOCATED AT
RED LION HUNDRED
NEW CASTLE COUNTY, DELAWARE

DATA

PROJECT NAME: CANAL OVERLOOK
LOCATION: NEW CASTLE, DELAWARE
OWNERSHIP: NEW CASTLE COUNTY
SEWER TYPE: SANITARY
CLASSIFICATION: COLLECTION
APPLICATION NUMBER: -

BUOYANCY CALCULATIONS

DESIGN CRITERIA:

TOP OF WELL ELEV. = 21.00'
WATER TABLE ELEV. = 31.00'
BOTTOM OF WELL ELEV. = 0.34'
INSIDE DIA. OF WELL = 6'-0"
OUTSIDE DIA. OF WELL = 7'-2" (40.24 SQ.FT.)
OUTSIDE DIA. OF BOTTOM SLAB = 11'-2" (101 SQ.FT.)
WEIGHT OF WELL = 41,536 LBS (OBTAINED FROM MANUF.)
WEIGHT OF BOTTOM SLAB = 25,000 LBS (OBTAINED FROM MANUF.)
WEIGHT OF (2) PUMPS = 476 LBS (OBTAIN FROM MANUF.)
AREA OF BOTTOM SLAB BEYOND WET WELL = 101 SQ.FT.
EXPOSED AREA OF BOTTOM SLAB = 22.40 SQ.FT.
SOIL ABOVE BOTTOM SLAB = 1,361 FT.³ (60.76' x 22.40')

WET WELL VOLUME:

40.24 SQ.FT. x 21.66' = 871.6 FT.³
871.6 FT.³ x 7.48 GAL/FT.³ = 6,520 GALS.
6,520 GALS x 8.33 LBS/GAL = 54,308 LBS
MIN. HOLD-DOWN WEIGHT = 54,308 LBS

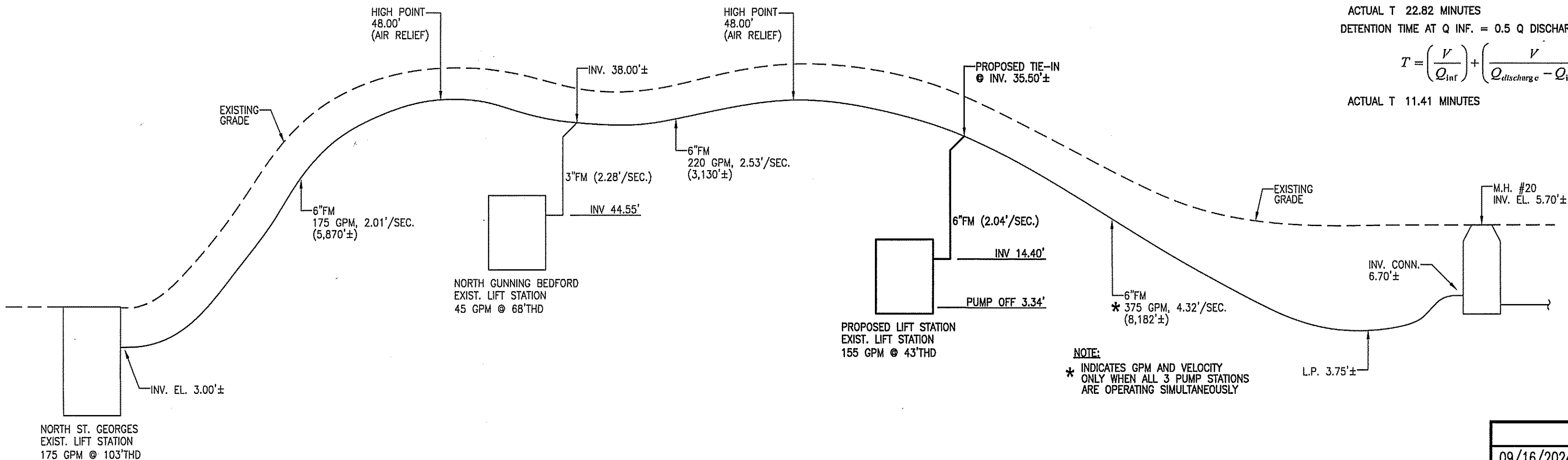
WEIGHT OF WELL:

WEIGHT OF WELL 1,760 LB/FT x 22.4 = 39,424 LBS
WEIGHT OF BOTTOM SLAB = 25,000 LBS
WEIGHT OF PUMPS = 476 LBS
WEIGHT OF 1'-0" SEWAGE = 1,760 LBS
WEIGHT OF SOIL ON BOTTOM SLAB = 117,540 LBS
TOTAL = 184,200 LBS

REQUIRED SAFETY FACTOR 1.25
SAFETY FACTOR AGAINST FLOTATION
184,200 LBS / 54,308 LBS = 3.4

GENERAL NOTES

- PRIOR TO COMMENCING WORK ON THIS PROJECT, CONTRACTOR SHALL VERIFY LOCATION, INVERT SIZE AND CONDITION OF EXISTING UTILITIES. SHOULD CONDITIONS EXIST OTHER THAN THOSE INDICATED AND WHICH COULD ALTER THE DESIGN INDICATED OR SPECIFIED, CONTRACTOR SHALL NOTIFY OWNER IMMEDIATELY FOR A DECISION BEFORE PROCEEDING.
- CONTRACTOR SHALL PROVIDE DEWATERING AS REQUIRED FOR CONCRETE WET WELL INSTALLATION.
- SANITARY SEWERS SHALL BE CONSTRUCTED IN ACCORDANCE WITH THE NEW CASTLE COUNTY STANDARD SPECIFICATIONS AND DETAILS.
- IT SHALL BE THE CONTRACTORS RESPONSIBILITY TO OBTAIN THE APPROVAL AND THE ACCEPTANCE OF THE SANITARY SEWERS BY NEW CASTLE COUNTY UPON COMPLETION OF CONSTRUCTION.
- EXISTING UTILITIES ARE IN ACCORDANCE WITH THE BEST AVAILABLE INFORMATION. IT SHALL BE THE CONTRACTORS RESPONSIBILITY TO VERIFY AND ALLOW FOR THEIR LOCATION.
- THE CONTRACTOR SHALL TAKE ALL NECESSARY PRECAUTIONS TO PROTECT THE EXISTING UTILITIES AND MAINTAIN UNINTERRUPTED SERVICE AND ANY DAMAGE DONE TO THEM DUE TO HIS NEGLIGENCE SHALL BE IMMEDIATELY REPAIRED AT HIS EXPENSE.
- THE CONTRACTOR SHALL BE RESPONSIBLE FOR REPLACEMENT OF DAMAGED OR DESTROYED LANDSCAPE.
- PLAN LOCATIONS AND DIMENSIONS SHALL BE STRICTLY ADHERED TO UNLESS OTHERWISE DIRECTED BY THE ENGINEER.
- FOR LOCATION OF LIFT STATION REFER TO CIVIL DRAWINGS.
- SANITARY SEWER BE CONSTRUCTED IN ACCORDANCE WITH THE MOST RECENT NEW CASTLE COUNTY STANDARD SPECIFICATIONS FOR CONSTRUCTION, SPECIAL PROVISIONS, SUPPLEMENTAL SPECIFICATIONS, STANDARD DETAILS, AND RECOMMENDED STANDARDS FOR WASTEWATER FACILITIES OR STRICTER STANDARDS IDENTIFIED BY THE ENGINEER.
- THE CONTRACTOR'S SHALL BE RESPONSIBLE TO OBTAIN APPROVAL AND ACCEPTANCE OF THE SANITARY SEWER SYSTEM BY NEW CASTLE COUNTY UPON COMPLETION OF CONSTRUCTION. AS-BUILT PLANS, SIGNED AND SEALED BY A PROFESSIONAL LAND SURVEYOR OR PROFESSIONAL LAND SURVEYOR OR PROFESSIONAL ENGINEER REGISTERED IN THE STATE OF DELAWARE MUST BE SUBMITTED TO NEW CASTLE COUNTY BEFORE ACCEPTANCE.
- DURING CONSTRUCTION, THE CONTRACTOR MUST HAVE IN HIS POSSESSION ON SITE, A SET OF CONSTRUCTION PLANS BEARING NEW CASTLE COUNTY'S STAMP OF APPROVAL.
- THE CONTRACTOR SHALL NOT PLACE, PLANT, PUT OR SET ANY STRUCTURE WITHIN THE SANITARY SEWER EASEMENT.
- A CONSTRUCTION PERMIT ISSUED BY THE STATE OF DELAWARE, DEPARTMENT OF TRANSPORTATION (DELDOT) IS REQUIRED BEFORE ANY WORK IS PERFORMED WITHIN A DELDOT RIGHT-OF-WAY. ALL WORK PERFORMED WITHIN DELDOT'S RIGHT-OF-WAY PROPERTY OWNED BY THE STATE OF DELAWARE SHALL BE PERFORMED IN ACCORDANCE WITH THE MOST RECENT DELDOT STANDARD SPECIFICATIONS AND UTILITY MANUAL.
- SANITARY SEWER IS TO BE IS TO BE PUBLICLY OWNED AND MAINTAINED BY NEW CASTLE COUNTY UPON ACCEPTANCE.
- CONSTRUCTION SHALL NOT DEVIATE FROM THE PLANS AND SPECIFICATIONS APPROVED BY NEW CASTLE COUNTY WITHOUT WRITTEN PERMISSION FROM NEW CASTLE COUNTY'S DEPARTMENT OF SPECIAL SERVICES. MATERIAL AND EQUIPMENT SUBMITTALS ARE SUBJECT TO REVIEW BY NEW CASTLE COUNTY. CONTACT THE SPECIAL SERVICES ENGINEERING DIVISION AT 302-395-5730.
- EROSION AND SEDIMENT CONTROL MEASURES SHALL BE IN ACCORDANCE WITH THE DELAWARE SEDIMENT AND STORMWATER REGULATIONS, DELAWARE EROSION AND SEDIMENT CONTROL HANDBOOK AND THE NEW CASTLE COUNTY DRAINAGE CODE, AS AMENDED.
- TYPICAL SEQUENCE OF CONSTRUCTION:
 - CONTACT NEW CASTLE COUNTY DEPARTMENT OF SPECIAL SERVICES (48 HOUR NOTICE AT 395-5756) PRIOR TO ANY EXCAVATION OR ACTIVITY INVOLVING SANITARY SEWER CONSTRUCTION, PUMP STATION CONSTRUCTION OR LATERAL TIE-INS TO EXISTING LINES.
 - CONSTRUCT PROPOSED SANITARY SEWER SYSTEM AS APPROVED BY NEW CASTLE COUNTY.
 - BACKFILL AND RE-GRADE AS REQUIRED.
 - PERFORM HYDROSTATIC TEST ON THE FORCE MAINS IN THE PRESENCE OF A NEW CASTLE COUNTY INSPECTOR. THE HYDROSTATIC TEST PRESSURE SHALL BE 1.5 TIMES THE WORKING PRESSURE OR 100 PSI, WHICHEVER IS GREATER. THE TEST SHALL LAST FOR A MINIMUM OF 2 HOURS AND AT THE END OF THE TEST PERIOD, IF THE TEST PRESSURE HAS REMAINED CONSTANT, THE PIPELINE SHALL HAVE PASSED THE TEST REPEATED.
 - PERFORM DRAW DOWN TEST ON THE PUMP STATION IN THE PRESENCE OF A NEW CASTLE COUNTY INSPECTOR TO VERIFY THE INSTALLATION MEETS DESIGNED OPERATING CONDITIONS.
 - THE ENTIRE LENGTH OF TRACER WIRE SHALL BE LOCATED USING TYPICAL LOW FREQUENCY LINE TRACING EQUIPMENT, WITNESSED BY THE NEW CASTLE COUNTY INSPECTOR. CONTINUITY TESTING IN LIEU OF ACTUAL LINE TRACING IS NOT ACCEPTABLE.
 - LATERAL CONNECTION FROM NEW HOMES/OFFICE BUILDINGS INTO THE SEWER LINE WILL NOT BE PERMITTED UNTIL AFTER ACCEPTANCE.
 - PRIOR TO NEW CASTLE COUNTY MAKING A FINAL INSPECTION, THE FOLLOWING ITEMS MUST BE COMPLETED:
 - ALL MANHOLES MUST BE BROUGHT TO GRADE AND HAVE CONCRETE COLLARS INSTALLED.
 - ALL MANHOLES AND VAULTS MUST BE CLEAN AND FREE FROM DEBRIS.
 - AS-BUILT DRAWINGS (SIGNED AND SEALED BY A REGISTERED LAND SURVEYOR OR PROFESSIONAL ENGINEER IN DELAWARE) WITH ONE (1) MYLAR AND THREE (3) SETS OF PRINTS MUST BE SUBMITTED TO NEW CASTLE COUNTY.
 - TURF TRAIL IS CONSTRUCTED IN ACCORDANCE WITH NCC DETAIL SS-MISC-2, OR IF PIPE AND MANHOLES ARE WITHIN A PROPOSED ROADWAY, STABILIZED ROADWAY ACCESS IS CONSTRUCTED FOR THE PURPOSE OF MAINTAINING THE CONSTRUCTED SANITARY SEWER SYSTEM UNTIL FINAL PAVING IS COMPLETED.
 - CERTIFICATES OF OCCUPANCY WILL NOT BE ISSUED UNTIL THE AS-BUILT DRAWINGS HAVE BEEN RECEIVED, REVIEWED, AND APPROVED AND THE SANITARY SEWER CONSTRUCTION (INCLUDING ALL APPURTENANCES HAVE BEEN ACCEPTED BY NEW CASTLE COUNTY).
- THE CONTRACTOR SHALL CONTACT NICK DIPALO OF NORTHEAST REGIONAL SALES; TELEPHONE # (908) 605-4531 TO PERFORM AN IN FIELD RADIO FREQUENCY SURVEY. THE RADIO SURVEY SHALL BE SUBMITTED TO N.C.C. FOR REVIEW. N.C.C. SHALL DETERMINE THE APPROPRIATE METHOD OF TELEMTRY.



1 EXISTING 6" FORCE MAIN PROFILE
P-1 SCALE: NONE

DESIGN CONSIDERATIONS

TYPE OF PIPE: HDPE-DR11
LENGTH: 1,800'± HDPE & 40' D.I.
DIAMETER: 4" & 6"
DESIGN FLOW: 108 SINGLE FAMILY HOMES - ACTUAL
108 x 300 GPD = 32,400 GPD
PEAK FLOW: 32,400 GPD x 4 = 129,600 GPD
129,600 GPD ÷ 1,440 = 90 GPM
MINIMUM 2.0 FT/SEC
VELOCITY = $\frac{4.084 \times 155}{5.67} = 2.04$ FPS
VELOCITY = 2.04 FPS

SEPARATIONS FROM: 10'-0" HORIZ. 1'-6" VERT. AS PER STATES STANDARDS WATER MAINS.

TELEMETRY: CENTRAL STATION AUTOMATICALLY NOTIFIED IN THE EVENT OF AN EMERGENCY BY RADIO. THE CONTRACTOR SHALL CONTACT BRISTOL BABCOOK - RADIO GROUP @ 410-795-6795 TO PERFORM AN IN-FIELD RADIO FREQUENCY SURVEY. THE RADIO SURVEY SHALL BE SUBMITTED TO N.C.C. FOR REVIEW. N.C.C. SHALL DETERMINE THE APPROPRIATE METHOD OF TELEMTRY.

EMERGENCY BACKUP: DIESEL GENERATOR

FRICTION LOSS: PIPE FRICTION LOSS:

STATIC HEAD: 35.50' (HIGH POINT) - (3.34') (PUMP OFF) = 32.16'

BASEN FITTINGS & DUCTILE IRON PIPE:

D.I. FITTINGS	QTY.	EQUIV. LENGTH	SAFETY FACTOR	TOTAL
4" 90° ELBOW	3	11	1.25	41.25
4" TEE (BRANCH FLOW)	1	7	1.25	8.75
4" TEE (SIDE-FLOW)	1	22	1.25	27.50
SWING CHECK	1	25	1.25	31.25
GATE VALVE	1	32	1.25	40.00
4" PIPE	1	40	0	40.00
				189'

$$HL = 189' \left[\frac{VELOCITY}{0.115 \times C \times d^{4.83}} \right]^{1.852}$$

C = 120
d = 4
V = 3.95 FPS
HL = 3.69

PIPE FRICTION LOSS (HDPE):

FROM L.S. TO EXIST. 6"FM

$$HL = 1,800' \left[\frac{VELOCITY}{0.115 \times C \times d^{4.83}} \right]^{1.852}$$

C = 120
d = 5.57
V = 2.04 FPS
HL = 4.04

FROM 6"FM TIE-IN TO GRAVITY M.H.:

$$HL = 8,182' \left[\frac{VELOCITY}{0.115 \times C \times d^{4.83}} \right]^{1.852}$$

C = 120
d = 5.956
V = 1.78 FPS
HL = 23.26

PIPE SIZE = 4" @ 90 GPM
W/ FITTINGS FROM L.S. TO EXIST. 6"FM = 7.04 FT.WG
FITTINGS & BASIN FRICTION = 3.69 FT.WG
STATIC HEAD = 32.16 FT.WG
W/ FITTINGS FROM 6"FM TIE-IN TO GRAVITY M.H. = 0.00 FT.WG. || SINCE ELEVATION IS GREATER THAN FRICTION LOSS (HIGH-POINT OF 35.50' AND END-POINT OF 6.70' = 28.8')

TOTAL = 42.89 FT.WG
≈ 43.00 FT.WG

PUMP RUN TIME:

GROUND ELEV. 21.00
INFLUENT SEWER INVERT 6.43
ALARM ON 6.43
LAG ON 5.93
LEAD ON 5.43
PUMPS OFF 3.34
WET WELL BOTTOM 0.34

ACTUAL DRAWDOWN DEPTH 2.09 FT (BASED ON THE ACTUAL WET WELL ELEVATION)

EFFECTIVE CYCLE TIME AT Q INF. = 0.5 Q DISCHARGE

ACTUAL T 22.82 MINUTES

DETENTION TIME AT Q INF. = 0.5 Q DISCHARGE

$$T = \left(\frac{V}{Q_{inf}} \right) + \left(\frac{V}{Q_{discharge} - Q_{inf}} \right)$$

ACTUAL T 11.41 MINUTES

GORMAN-RUPP
SFV3B-X
Performance curve

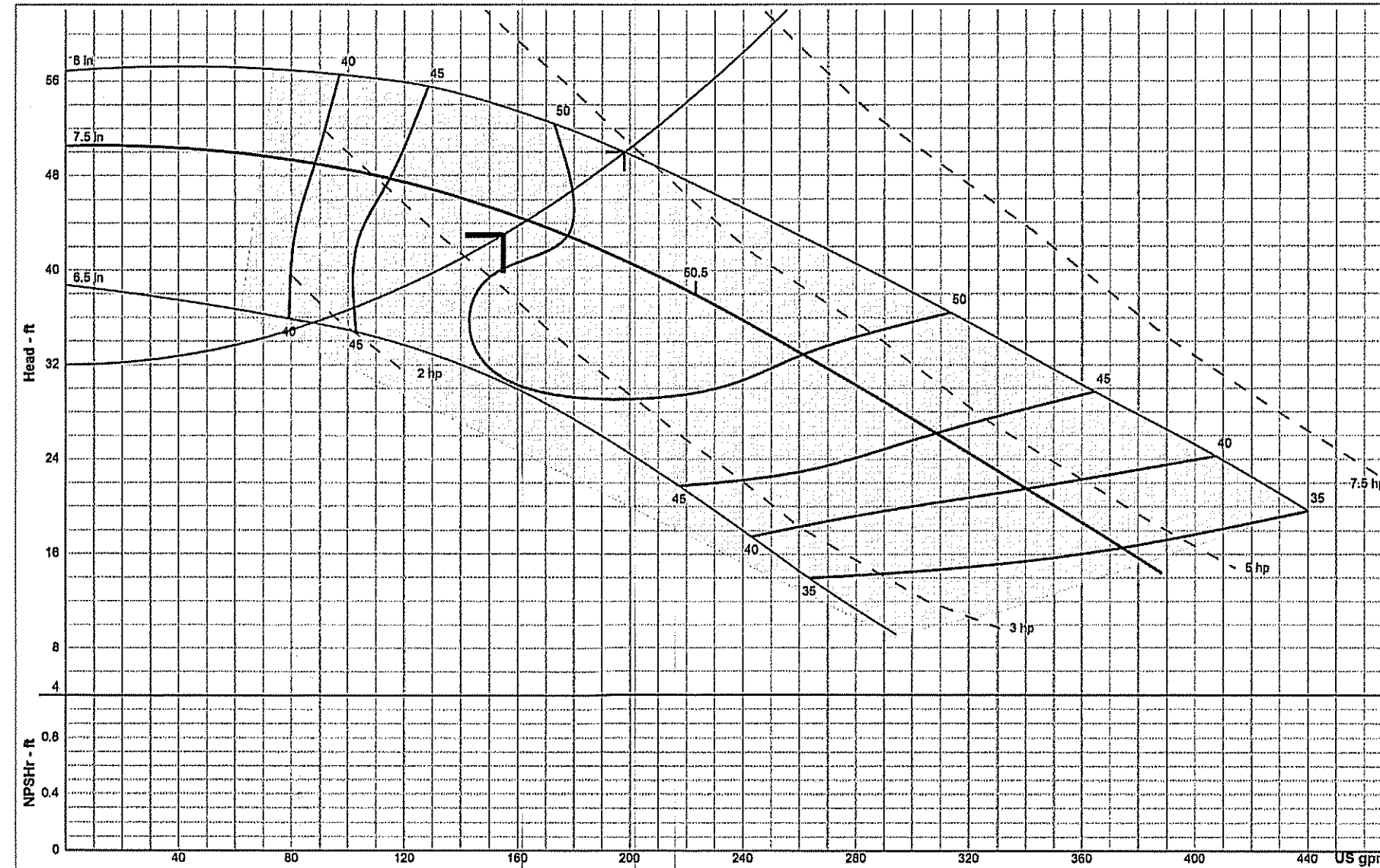
PUMP
Discharge Flange Diameter 9 inch
Suction Flange Diameter 9 inch
Impeller diameter 7.5"
Number of blades 2

NOTE:
DEVIATION FROM THE SPECIFIED PUMP WILL
REQUIRE ADDITIONAL REVIEW/SUBMITTALS.

MOTOR
Motor # SFV3B-1
Slator variant
Frequency 60 Hz
Rated voltage 230 V
Number of poles 2
Phases 3
Rated power 7 hp
Rated current 16.4 A
Starting current 96.0 A
Rated speed 1,750 rpm

POWER FACTOR
1/1 Load 0.86
3/4 Load 0.84
1/2 Load 0.74

MOTOR EFFICIENCY
1/1 Load 86.0 %
3/4 Load 87.0 %
1/2 Load 87.0 %



This curve is provided for preliminary selection only. Please consult factory before making final pump or motor selections. Not NSF certified.

Company: New Castle County
Name: Canal Overlook PS
Date: 09/10/2024
Gorman-Rupp SEW 60Hz
Catalog: Gorman-Rupp Engineered Systems Pumps & EC
SF-SERIES STD 3PH - 1800 rpm
Design Point: 155 US gpm, 43 ft
Static Head: 32 ft
Size: SFV3B-1
Speed: 1750 rpm
Dia: 7.5 in
Curve: SFV3B-1



"The New Castle County Department of Public Works has reviewed this document bearing this stamp and any supporting documents submitted therewith solely for compliance with applicable New Castle County standards and specifications pertaining to the sanitary sewer design concept. New Castle County is not approving the suitability of the design or engineering and shall not be responsible for damages or losses of any kind arising from errors or omissions in this document or any other documents submitted or related to the design or installation of the proposed sanitary sewer."

BA vol 9/24

SUBMITTAL TABLE

SUBMISSION	DESCRIPTION	DESIGN STANDARD	TO BE OBTAINED FROM
BP-01	PUMP STATION BUILDING PLAN COMPLIANCE CERTIFICATION	NCC LAND USE	ENGINEER
BP-02	PUMP STATION BUILDING PLAN COMPLIANCE CERTIFICATION	NCC LAND USE	ARCHITECT
BP-03	BUILDING PERMIT FOR THE PUMP STATION BUILDING	NCC LAND USE	NCC LAND USE
SC-01	SPECIFICATIONS OF ALL THE CONSTRUCTION MATERIALS	DPW STANDARD SPECIFICATION	CONTRACTOR
SD-01	SHOP DRAWING FOR PUMP STATION BUILDING	DPW STANDARD SPECIFICATION	CONTRACTOR
SD-02	SHOP DRAWING FOR PUMP AND PIPE LAYOUTS	DPW STANDARD SPECIFICATION	CONTRACTOR
SD-03	SHOP DRAWING FOR PRE CAST WET WELL	ASTM-C478	CONTRACTOR
ST-01	SOIL TEST REPORT FOR TEST PIT AT THE WET WELL LOCATION	DPW STANDARD SPECIFICATION	GEO-TECH
T-01	RADIO TEST FOR THE TELEMTRY SIGNAL STRENGTH	DPW STANDARD SPECIFICATION	INSTALLER

PLUMBING DRAWING LIST

SHEET NUMBER	DRAWING TITLE
P-1	PLUMBING: NOTES, CALCULATIONS AND PUMP INFORMATION
P-2	PLUMBING: FLOOR PLAN, ELEVATION, LEGEND, NOTES, DETAILS & SCHEDULE
P-3	PLUMBING: SPECIFICATIONS
P-4	PLUMBING: LIFT STATION SPECIFICATIONS



MECHANICAL/ELECTRICAL
Paragon Engineering Corp.
708 Philadelphia Pike
Wilmington, DE 19809
phone: 302.762.6010 fax: 302.762.0653

NEW CONSTRUCTION:

CANAL OVERLOOK PUMPING STATION
RED LION HUNDRED NEW CASTLE COUNTY, DELAWARE 19720

PLUMBING: NOTES, CALCULATIONS AND PUMP INFORMATION

LATEST PLOT DATE
9/30/2024

SCALE: AS NOTED

DRAWN BY: RD

CHECKED BY: JBG

APPROVED BY: PEC

DATE

03/18/2024

03/18/2024

03/18/2024

PROJ. NO. M2307

P-1