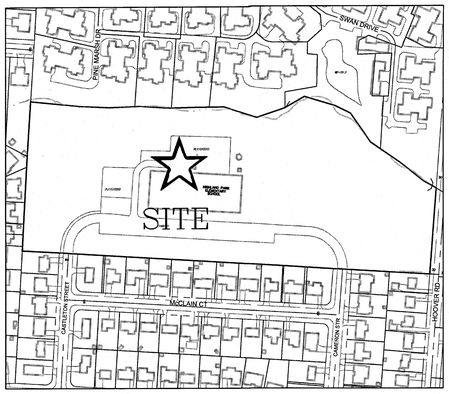


LOCATION MAP

SITE DATA

TOTAL ACREAGE OF SITE:	14.59 ACRES
EXISTING IMPERVIOUS	2.97 ACRES
PROPOSED IMPERVIOUS	4.03 ACRES (28%)
PROPOSED LANDSCAPING	11.52 ACRES (72%)
DISTANCE TO NEAREST CROSS STREET: (TO THE INTERSECTION OF CASTLETON STREET AND MCCLAIN COURT)	151 FEET
TOTAL NUMBER OF PARKING SPACES:	135
NUMBER OF NEW STD. SPACES:	128
NUMBER OF NEW H.C. SPACES:	7
BUILDING SQUARE FOOTAGE:	69,639 SF
CLASSROOM SQUARE FOOTAGE:	26,917 SF

SITE PLAN NOTES:

1. SIDEWALK WITHIN RIGHT-OF-WAY THAT IS TO BE REMOVED AND REPLACED DUE TO UTILITY INSTALLATION OR ENTRANCE DRIVE CONSTRUCTION SHALL BE PER C-GC-46A.
2. PIPING WITHIN THE RIGHT-OF-WAY CONNECTING TO PUBLIC STORM SEWER SHALL BE INSTALLED WITH GRANULAR TYPE A BACKFILL PER C-GC-26.
3. ALL ROOFTOP MOUNTED SERVICE/MECHANICAL EQUIPMENT SHALL BE PAINTED TO MATCH THE BRICK COLOR.

ZONING

EXISTING ZONING: SD-1 EDUCATIONAL
PROPOSED ZONING: SD-1 EDUCATIONAL

UTILITY NOTES

1. ALL ENDWALLS SHALL BE PER CITY OF GROVE CITY STANDARD DRAWING C-GC-23.
2. ALL HEADWALLS SHALL HAVE STONE FACING CONSISTING OF NORTH SHORE BUFF LIMESTONE PER CITY OF GROVE CITY REQUIREMENTS.
3. PORTIONS OF THE SITE ARE WITHIN THE 100-YEAR FLOODPLAIN ACCORDING TO FEMA MAP NO. 39049C0314K. PROPOSED CONSTRUCTION ACTIVITIES SHALL NOT ENCROACH INTO FLOODPLAIN.
4. ALL WATERMAIN CROSSINGS SHALL MAINTAIN A VERTICAL SEPARATION OF 18" MINIMUM. SANITARY SEWER SHALL BE LOCATED A MINIMUM OF 18" BELOW WATERMAIN AT ALL CROSSINGS.

PROJECT NARRATIVE:

THE PROPOSED HIGHLAND PARK SCHOOL WILL BE LOCATED ON THE SAME SITE AS THE EXISTING ELEMENTARY SCHOOL. THE PROJECT WILL BEGIN WITH INSTALLING REQUIRED EROSION CONTROL ITEMS. ONCE EROSION CONTROL ITEMS ARE IN PLACE, DEMOLITION OF THE EXISTING BUILDING AND PARKING LOTS WILL TAKE PLACE. FOLLOWING DEMOLITION, TOP SOIL WILL BE STRIPED AND STOCK PILED AND MAINTAINED WITH TEMPORARY SEEDING THROUGH THE COMPLETION OF THE PROJECT, MASS GRADING FOR THE BUILDING PAD AND PARKING WILL BE PERFORMED. THIS PROJECT INCLUDES THE INSTALLATION OF SITE UTILITIES (INCLUDING NEW STORM SYSTEMS, SANITARY SERVICE, AND WATER LINES). REQUIRED EROSION CONTROL MEASURES WILL BE INSTALLED AS WORK PROGRESSES. FOLLOWING THE COMPLETION OF SITE UTILITIES AND THE BUILDING PAD, ASPHALT PAVING FOR PARKING LOTS WILL BE PLACED ALONG WITH THE INSTALLATION OF CONCRETE WALKS AROUND THE SITE. TO COMPLETE THE PROJECT, THE SITE WILL BE STABILIZED WITH LANDSCAPING AND PERMANENT SEEDING.

STORM SCHEDULE

HW-1
N:691732.36
E:1808798.73
GROVE CITY STANDARD
ENDWALL C-GC-24
INV=801.08 (18") SW

CB-2
N: 691706.49
E:1808770.56
GROVE CITY STANDARD
INLET C-GC-4 (2'X2')
GRATE=806.75
24"X12" WINDOW INV=804.72 (NW, SE)
24"X5" WINDOW INV=803.55 (SW)
1.125" ORIFICE INV=801.50
INV IN=801.27 (6") SW
INV OUT=801.27 (18") NE

HW-3
N:691672.63
E:1808710.57
GROVE CITY STANDARD
ENDWALL C-GC-23
INV=803.00 (30") SW

MH-4
N:691663.51
E:1808692.77
CONTECH CDS4030
WATER QUALITY STRUCTURE
OR APPROVED EQUAL
RIM=807.62
INV IN=803.07 (30") W
INV OUT=803.07 (30") NE

CB-5
N:691656.80
E:1808673.19
GROVE CITY STANDARD
INLET C-GC-4 (3'X3')
GRATE=808.12
INV IN=803.64 (24") SW
INV IN=803.14 (30") NW
INV OUT=803.14 (30") E

CB-6
N:691601.90
E:1808650.12
GROVE CITY STANDARD
INLET C-GC-4 (3'X3')
GRATE=806.94
INV IN=803.74 (24") W
INV OUT=803.74 (24") NE

CB-7
N:691610.37
E:1808506.33
GROVE CITY STANDARD
INLET C-GC-4 (3'X3')
GRATE=810.07
INV IN=804.00 (12") N
INV IN=804.00 (24") W
INV OUT=804.00 (24") E

CB-8
N:691580.12
E:1808314.10
GROVE CITY STANDARD
INLET C-GC-4 (3'X3')
GRATE=808.20
INV IN=804.35 (24") W
INV OUT=804.35 (24") E

CB-9
N:691590.95
E:1808130.42
GROVE CITY STANDARD
INLET C-GC-4 (3'X3')
GRATE=808.20
INV IN=805.68 (12") NW
INV OUT=804.68 (24") E

CB-10
N:691685.88
E:1807977.87
GROVE CITY STANDARD
INLET C-GC-4 (3'X3')
GRATE=810.34
INV IN=806.47 (6") NW
INV IN=806.47 (12") NE
INV OUT=806.47 (12") SE

CB-20
N:691776.38
E:1808507.89
GROVE CITY STANDARD
INLET C-GC-4 (3'X3')
GRATE=810.78
INV IN=804.91 (12") W
INV IN=804.91 (12") W
INV IN=803.41 (30") NW
INV OUT=803.41 (30") SE

CB-21
N: 691897.14
E:1808382.10
GROVE CITY STANDARD
INLET C-GC-4 (3'X3')
GRATE=809.72
INV IN=804.14 (24") W
INV OUT=803.64 (30") SE

CB-22
N:691903.70
E:1808270.73
GROVE CITY STANDARD
INLET C-GC-4 (3'X3')
GRATE=809.72
INV IN=804.14 (12") S
INV IN=804.36 (24") W
INV OUT=804.36 (24") E

CB-23
N:691911.47
E:1808138.83
GROVE CITY STANDARD
INLET C-GC-4 (3'X3')
GRATE=809.45
INV IN=804.62 (12") S
INV IN=805.62 (12") SW
INV IN=805.37 (15") W
INV OUT=804.62 (24") E

CB-24
N: 691910.99
E:1807957.32
GROVE CITY STANDARD
INLET C-GC-4 (3'X3')
GRATE=811.22
INV OUT=806.01 (15") E

CB-30
N:691759.76
E:1808351.75
GROVE CITY STANDARD
INLET C-GC-4 (3'X3')
GRATE=811.27
INV IN=808.77 (6") N
INV IN=807.18 (4") SW
INV OUT=805.70 (12") E

CB-40
N:691855.12
E:1808041.16
GROVE CITY STANDARD
INLET C-GC-4 (2'X2')
GRATE=810.70
INV IN=806.18 (12") S
INV IN=806.18 (12") W
INV OUT=806.18 (12") NE

CB-41
N:691855.01
E:1807957.43
GROVE CITY STANDARD
INLET C-GC-4 (3'X3')
GRATE=809.59
INV OUT=806.60 (12") E

PROPOSED SYMBOLS

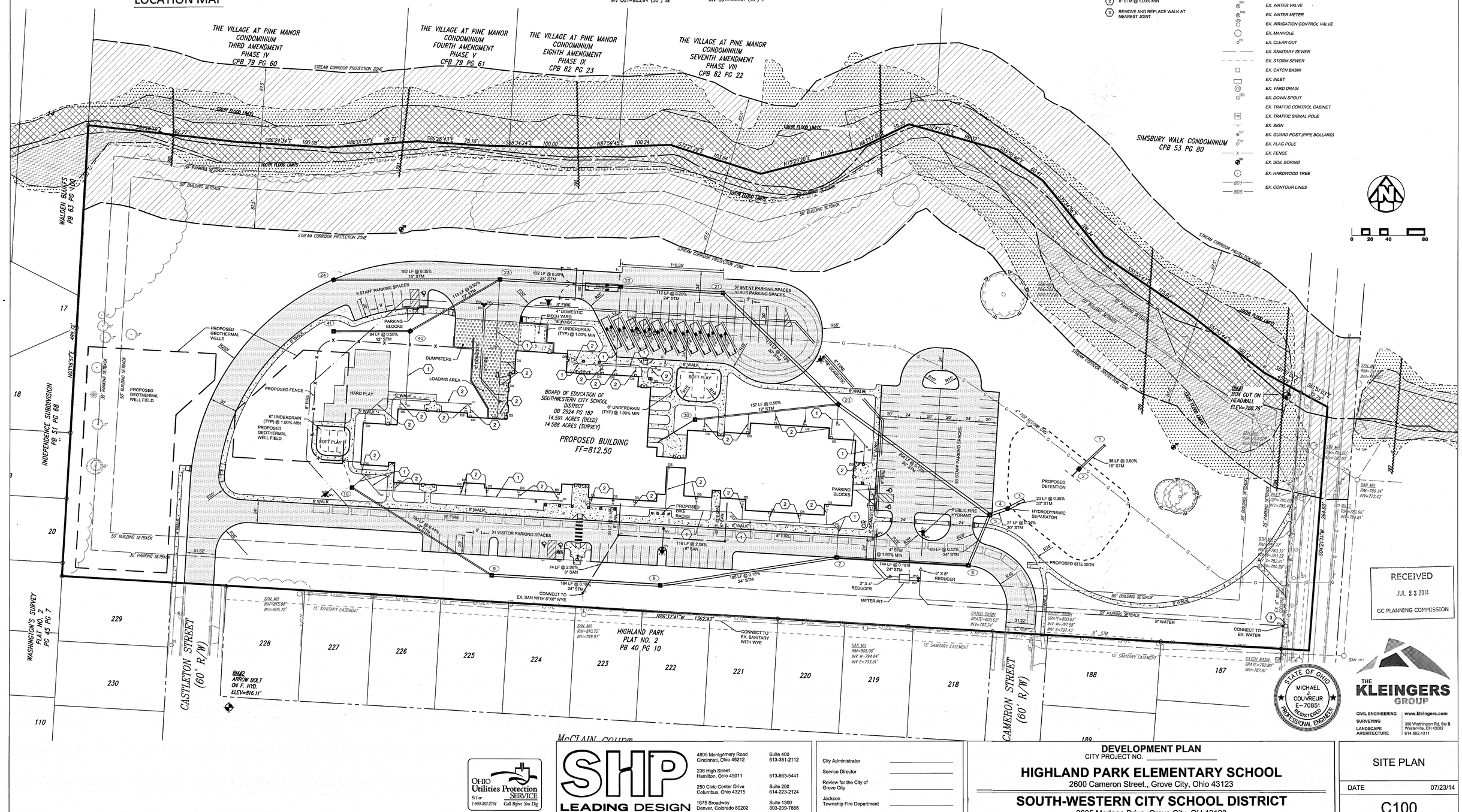
- FIRE DEPARTMENT CONNECTION
- FIRE HYDRANT
- PROPOSED CATCH BASIN
- PROPOSED STORM MANHOLE
- PROPOSED SANITARY MANHOLE
- PROPOSED ASPHALT PAVEMENT
- PROPOSED HEAVY DUTY CONCRETE
- PROPOSED CONCRETE WALK
- PROPOSED STORM PIPE
- PROPOSED SANITARY PIPE
- PROPOSED WATER PIPE

CODED NOTES

1. 12" STM @ 0.50% MIN
2. 8" STM @ 1.00% MIN
3. REMOVE AND REPLACE WALK AT NEAREST JOINT

LEGEND

- CONCRETE MONUMENT FOUND
- 5/8" CAPPED IRON PIN SET
- 5/8" IRON PIN FOUND
- 1" IRON PIPE FOUND
- NAIL SET
- BENCHMARK
- EX. UTILITY POLE
- EX. GUY WIRE
- EX. UNDERGROUND ELECTRIC
- EX. OVERHEAD ELECTRIC
- EX. HVAC UNIT
- EX. TRANSFORMER
- EX. GROUND LIGHT
- EX. ELECTRIC BOX
- EX. LIGHT POLE
- EX. UNDERGROUND TELEPHONE
- EX. OVERHEAD TELEPHONE
- EX. TELEPHONE MANHOLE
- EX. TELEPHONE PEDESTAL
- EX. GAS MAIN
- EX. GAS VALVE
- EX. UNDERGROUND CABLE TV
- EX. WATER MAIN
- EX. FIRE HYDRANT
- EX. WATER VALVE
- EX. WATER METER
- EX. IRRIGATION CONTROL VALVE
- EX. MANHOLE
- EX. CLEAN OUT
- EX. SANITARY SEWER
- EX. STORM SEWER
- EX. CATCH BASIN
- EX. INLET
- EX. YARD DRAIN
- EX. DOWN SPOUT
- EX. TRAFFIC CONTROL CABINET
- EX. TRAFFIC SIGNAL POLE
- EX. SIGN
- EX. GUARD POST (PIPE BOLLARD)
- EX. FLAG POLE
- EX. FENCE
- EX. SOIL BORING
- EX. HARDWOOD TREE
- EX. CONTOUR LINES
- EX. CONCRETE
- EX. ASPHALT
- FLOOD ZONE X
- STREAM CORRIDOR PROTECTION ZONE
- FLOODWAY
- FLOOD ZONE AE
- BASE FLOOD ELEVATION



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MICHAEL J. COUVREUR
E-70851
REGISTERED
PROFESSIONAL ENGINEER

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236 High Street, Hamilton, Ohio 45011, 513-863-5441
250 Civic Center Drive, Columbus, Ohio 43215, Suite 200, 614-223-2124
1675 Broadway, Denver, Colorado 80202, Suite 1300, 303-209-7866

City Administrator _____
Service Director _____
Review for the City of Grove City _____
Jackson Township Fire Department _____

DEVELOPMENT PLAN
CITY PROJECT NO. _____

HIGHLAND PARK ELEMENTARY SCHOOL

2600 Cameron Street., Grove City, Ohio 43123

SOUTH-WESTERN CITY SCHOOL DISTRICT

3805 Marlane Drive, Grove City, OH 43123

SITE PLAN

DATE 07/23/14

C100

EROSION CONTROL LEGEND

- DB — DANDY BAG
- BD — DANDY CURB PROTECTION
- SF — SILT FENCE
- TP — TREE PROTECTION
- 100 YEAR FLOOD ROUTE
- CONSTRUCTION ENTRANCE
- CWO — CONCRETE WASHOUT
- LIMITS OF DISTURBANCE

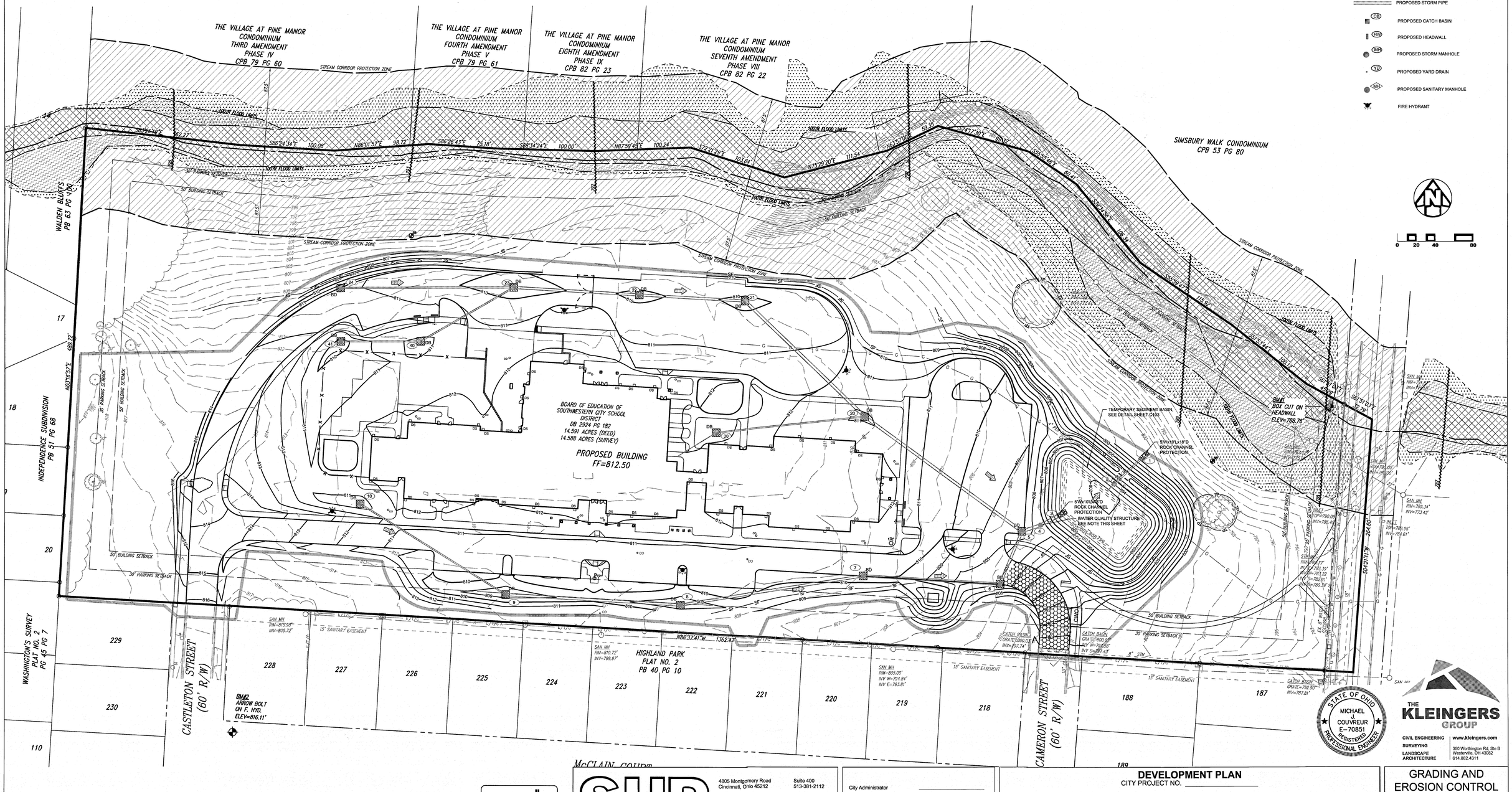
WATER QUALITY TREATMENT STRUCTURE NOTE
WATER QUALITY TREATMENT STRUCTURE SHALL BE A CONTECH CDS4030 8' DIAMETER STRUCTURE OR APPROVED EQUAL. STRUCTURE SHALL HAVE MINIMUM TREATMENT CAPACITY OF 4.5 CFS AND A MINIMUM INTERNAL BYPASS CAPACITY OF 20 CFS.

GRADING LEGEND

- 825 — EX CONTOUR
- 821 — EX CONTOUR
- 825 — PROPOSED CONTOUR
- 824 — PROPOSED CONTOUR

PROPOSED SYMBOLS

- PROPOSED STORM PIPE
- CB — PROPOSED CATCH BASIN
- HW — PROPOSED HEADWALL
- MH — PROPOSED STORM MANHOLE
- YD — PROPOSED YARD DRAIN
- MH — PROPOSED SANITARY MANHOLE
- FIRE HYDRANT



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1675 Broadway Denver, Colorado 80202	Suite 1300 303-209-7866

City Administrator _____
Service Director _____
Review for the City of Grove City _____
Jackson Township Fire Department _____

DEVELOPMENT PLAN
CITY PROJECT NO. _____

HIGHLAND PARK ELEMENTARY SCHOOL

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GRADING AND EROSION CONTROL PLAN

DATE 07/23/14

C101

OHIO EPA
NPDES STORMWATER CONSTRUCTION PERMIT
GENERAL PERMIT #OHC000004

PERMITTEE:	OWNER:
SOUTH-WESTERN CITY SCHOOL DISTRICT 3805 MARLANE DRIVE GROVE CITY, OHIO 43123 (614) 801-3000	SOUTH-WESTERN CITY SCHOOL DISTRICT 3805 MARLANE DRIVE GROVE CITY, OHIO 43123 (614) 801-3000

NPDES PERMIT: __________

DATE OF ISSUE: __________

CENTER OF PROJECT

LATITUDE: N 39°89'78.85"   LONGITUDE: W 83°07'11.25"

PROJECT DESCRIPTION

NEW ELEMENTARY SCHOOL IN GROVE CITY, FRANKLIN COUNTY, OHIO, INCLUDING THE SCHOOL BUILDING, PLAY FIELDS, PARKING LOTS, SANITARY SEWERS, STORM SEWERS, WATERLINES AND OTHER RELATED UTILITIES. SOIL DISTURBING ACTIVITIES WILL INCLUDE: CLEARING AND GRUBBING INSTALLATION OF EROSION AND SEDIMENT CONTROLS, GRADING, INSTALLATION OF THE SEWERS AND OTHER UTILITIES AND THE PREPARATION FOR FINAL SEEDING.

PROJECT DATA

TOTAL SITE AREA:	14.59 ACRES
TOTAL DISTURBED AREA:	8.63 ACRES
PROPOSED IMPERVIOUS AREA:	4.03 ACRES
EXISTING IMPERVIOUS AREA:	2.97 ACRES
RUNOFF COEFFICIENT FOR PRE-CONSTRUCTION:	C=0.51
RUNOFF COEFFICIENT FOR POST-CONSTRUCTION*:	C=0.55
PRIOR LAND USE:	ELEMENTARY SCHOOL
RECEIVING WATER:	MARSH RUN TO SCIOTO BIG RUN TO SCIOTO RIVER
ESTIMATED CONSTRUCTIONS DATES:	12/2014 - 8/2016
SOIL TYPES, DESCRIPTIONS:	CfB - CELINA-URBAN LAND COMPLEX 2 TO 6 PERCENT SLOPES CsB - CROSBY-URBAN LAND COMPLEX 2 TO 6 PERCENT SLOPES Mh - MEDWAY SILT LOAM OCCASIONALLY FLOODED MIC2 - MOAMOAN SILTY CLAY LOAM 6 TO 12 PERCENT SLOPES, ERODED MnC - MIAMIAN-URBAN LAND COMPLEX 6 TO 12 PERCENT SLOPES

EMERGENCY ACTION & SPILL PREVENTION PLAN

THE SCOPE OF WORK COVERED BY THIS PLAN INCLUDES EMERGENCY RESPONSE TO SPILLS, CONTAINMENT OF SPILLED LIQUIDS, EMERGENCY NOTIFICATION NUMBERS, AND SOIL EXCAVATION FOR SPILL CLEAN-UP.

IN THE EVENT OF A SPILL EVENT THE EMPLOYEE SHALL ASSESS THE SPILL AND IMMEDIATELY NOTIFY THE SAFETY OFFICER AND SUPERVISOR IN CHARGE, OR OTHER INDIVIDUALS AS LISTED BELOW.

TITLE	NAME	PHONE NUMBER
SITE SUPERINTENDENT	________	________
OWNER	MARK WALLER	614-801-3133

IMMEDIATELY AFTER NOTIFICATION, THE EMPLOYEE WILL BE DIRECTED BY THE SAFETY OFFICER, OR RESPONSIBLE PARTY TO START CONTAINMENT PROCEDURES TO PREVENT THE MATERIAL FROM REACHING THE STORM SEWERS, DRAINAGE DITCH, AND OTHER OUTLETS USING THE FOLLOWING ACTIONS OR ANY OTHER MEANS NECESSARY WITHOUT COMPROMISING WORKER SAFETY:

1) CLEAR PERSONNEL FROM THE SPILL AREA AND ROPE OFF AREA.
2) STOP THE SPILL.
3) USE SORBENT MATERIALS, PLUG PUTTY, OR HOLE PUTTY AS NECESSARY TO CONTROL THE SPILL AT THE SOURCE.
4) CONSTRUCT A TEMPORARY CONTAINMENT DIKE OF SORBENT MATERIALS OR DIRT TO CONTAIN SPILL.

SPILL KITS WILL BE LOCATED ON THE PROJECT AS DESIGNATED ON THE SWPPP PLAN.

UPON COMPLETION OF CONTAINMENT OPERATIONS, PROPER CLEAN-UP PROCEDURES WILL BE IMPLEMENTED IN ACCORDANCE WITH REGULATORY PROCEDURES.

ADDITIONAL EMERGENCY CONTACT NUMBERS:	24 HOUR PHONE NO.:
___	________
___	________
___	________
OHIO EPA	614-728-3898

GENERAL NOTES

THE CONTRACTOR IS HEREBY ADVISED THAT STRICTER POLLUTION CONTROL STANDARDS AND ENFORCEMENT HAVE BEEN IMPOSED BY THE OHIO EPA SINCE MARCH 10, 2003 AND WITH A REVISION IN APRIL 2008. ALSO, MANY PRIVATE CITIZEN ENVIRONMENTAL GROUPS, WHO HAVE BEEN KNOWN TO FILE CIVIL LEGAL ACTIONS, ARE PRESENT IN THE AREA AND OBSERVE ALL CONSTRUCTION OPERATIONS.

THE CONTRACTOR SHALL INFORM ALL SUBCONTRACTORS OF THE REQUIREMENTS AND RESPONSIBILITIES OF THE SWPPP AND SHALL DOCUMENT ALL SUCH NOTIFICATIONS AND/OR DISCUSSIONS. ALL SUBCONTRACTORS SHALL SIGN THE NOI.

THE CONTRACTOR WILL BE REQUIRED TO PARTICIPATE IN SEDIMENT AND EROSION CONTROL INSPECTIONS ON A WEEKLY BASIS AND SIGN AN APPROVED INSPECTION SHEET THAT SHALL BE KEPT ON FILE AT THE JOB SITE.

UNLESS OTHERWISE NOTED, STANDARDS AND SPECIFICATIONS ESTABLISHED IN THE LATEST EDITION OF THE ODNR "RAINWATER AND LAND DEVELOPMENT" HANDBOOK SHALL GOVERN THE EROSION AND SEDIMENT CONTROL INSTALLATIONS SPECIFIED ON THIS PLAN.

THIS PROJECT WILL INVOLVE SEVERAL CONSTRUCTION PHASES AND SEQUENCING THROUGHOUT ITS LIFETIME. IT IS VERY IMPORTANT THAT ALL TEMPORARY SEDIMENT AND EROSION CONTROL (S&EC) FIELD METHODS ALONG WITH THIS PLAN, ARE UPDATED TO REFLECT THE ACTUAL FIELD CONDITIONS, CURRENT WEATHER CONDITIONS AND SITE GRADE CHANGES. THE CONTRACTOR, OWNER, ENGINEER OR THE OHIO EPA CAN AND WILL MODIFY THIS PLAN AS NECESSARY.

THE CONTRACTOR WILL VOLUNTARILY SELF REPORT ANY POTENTIAL VIOLATIONS OF THE OEPA NPDES PERMIT TO THE OWNER, ENGINEER AND THE OEPA.

THE CONTRACTOR SHALL REMOVE EXISTING GROUND COVER ONLY AS NECESSARY FOR THE PROJECT PHASE CURRENTLY UNDER CONSTRICTION.

CONSTRUCTION AND DEMOLITION DEBRIS SHALL BE PROPERLY DISPOSED OF ACCORDING TO OHIO EPA REQUIREMENTS.

THE CONTRACTOR WILL BE REQUIRED TO BUILD SEDIMENT BASINS OR SEDIMENT TRAPS OR USE EQUAL METHODS TO DETAIN AND CLEAN WATER TO ACCEPTABLE EPA STANDARDS BEFORE RELEASING THE WATER BACK INTO THE STREAM.

ALL DEWATERING ACTIVITY SHALL BE CARRIED OUT IN ACCORDANCE WITH THE PRACTICES OUTLINED IN PART III.G.2.G.IV OF THE OEPA GENERAL PERMIT.

THERE SHALL BE NO TURBID DISCHARGES TO SURFACE WATERS, RESULTING FROM DEWATERING ACTIVITIES. SEDIMENT-LADEN WATER MUST PASS THROUGH A SETTLING POND, FILTER BAG, OR OTHER COMPARABLE PRACTICE, PRIOR TO DISCHARGE.

NO SOLID OR LIQUID WASTE SHALL BE DISCHARGED INTO STORM WATER RUNOFF.

ALL PROCESS WASTEWATER (EQUIPMENT WASHING, LEACHATE FROM ON-SITE WASTE DISPOSAL, ETC.) SHALL BE COLLECTED AND DISPOSED OF AT A PUBLICLY OWNED TREATMENT WORKS.

ALL CONSTRUCTION ACTIVITIES MUST COMPLY WITH ALL LOCAL EROSION/SEDIMENT CONTROL, WASTE DISPOSAL, SANITARY AND HEALTH REGULATIONS.

OTHER EROSION CONTROL ITEMS MAY BE NECESSARY DUE TO ENVIRONMENTAL CONDITIONS. THE CONTRACTOR SHALL BE RESPONSIBLE FOR INSTALLATION AND IMPLEMENTATION OF ADDITIONAL EROSION CONTROL ITEMS, AT THE ENGINEER'S DISCRETION.

NO SOIL, ROCK, DEBRIS OR OTHER MATERIAL SHALL BE DUMPED OR PLACED IN ANY AREAS NOT ADEQUATELY PROTECTED BY EROSION CONTROL INSTALLATIONS.

IT IS PREFERRED TO USE PERMANENT EROSION CONTROL ITEMS AS SHOWN IN THE PLANS TO CONTROL CONSTRUCTION POLLUTION WHEN POSSIBLE. OTHERWISE, THE TEMPORARY POLLUTION PREVENTION ITEMS ARE TO BE USED.

MOST TEMPORARY S&EC METHODS, INCLUDING BUT NOT LIMITED T0, SILT FENCE AND DITCH CHECKS MAY ALL HAVE TO BE PERIODICALLY REMOVED AND REPLACED, OR MOVED FROM THE EXISTING ROAD DITCH OR STRIPPED AREAS AS WORK PROGRESSES. ANY CHANGES SHALL BE NOTED IN THE PLAN BY RED LINE AND DATED ON A CORRECTIVE ACTION LOG.

ALL TEMPORARY SEDIMENT CONTROLS AND STORM WATER QUALITY METHODS WILL BE BUILT/INSTALLED AS THE PROJECT PROGRESSES TO ELIMINATE UNNECESSARY DISTURBANCE AND REDUNDANCY. ALL TEMPORARY CONTROLS SHALL BE IN PLACE AND FUNCTIONING PROPERLY WHEN THREATENING WEATHER IS IMMINENT.

"TEMPORARY STABILIZATION" MEANS THE ESTABLISHMENT OF TEMPORARY VEGETATION, MULCHING, GEOTEXTILES, SOD, PRESERVATION OF EXISTING VEGETATION AND OTHER TECHNIQUES CAPABLE OF QUICKLY ESTABLISHING COVER OVER DISTURBED AREAS TO PROVIDE EROSION CONTROL BETWEEN CONSTRUCTION OPERATIONS.

"PERMANENT STABILIZATION" MEANS THE ESTABLISHMENT OF PERMANENT VEGETATION, DECORATIVE LANDSCAPE MULCHING, MATTING, SOD, RIP RAP AND LANDSCAPING TECHNIQUES TO PROVIDE PERMANENT EROSION CONTROL ON AREAS WHERE CONSTRUCTION OPERATIONS ARE COMPLETE OR WHERE NO FURTHER DISTURBANCE IS EXPECTED FOR AT LEAST A YEAR.

OFF-SITE TRACKING OF SEDIMENTS SHALL BE MINIMIZED. A STABILIZED CONSTRUCTION ENTRANCE WILL BE PROVIDED TO HELP REDUCE VEHICLE TRACKING OF SEDIMENTS. ALL PAVED STREETS ADJACENT TO THE SITE WILL BE SWEPT DAILY TO REMOVE ANY EXCESS MUD, DIRT OR ROCK TRACKED FROM THE SITE. DUMP TRUCKS HAULING MATERIAL FROM THE CONSTRUCTION SITE WILL BE COVERED WITH A TARP.

OPERATION SEQUENCE FOR TEMPORARY AND PERMANENT BMP INSTALLATION

TO COMPLETE THE EXCAVATION AND CONSTRUCTION OF THE PROPOSED JOB IMPROVEMENTS, COORDINATION OF THE CONTRACTOR'S WORK CREWS WILL BE REQUIRED. TEMPORARY SEDIMENT CONTROL AND STORAGE DURING THE PROPOSED CONSTRUCTION WILL OCCUR IN TEMPORARY SEDIMENT BASIN, LOCATED IN THE PROPOSED DETENTION BASIN. WORK WILL GENERALLY PROCEED FROM DOWNSTREAM TO UPSTREAM IN THESE WORK AREAS. MUDDY WATER FROM EXCAVATED AREAS SHOULD BE PUMPED INTO DIVERSION CHANNELS THAT DISCHARGE INTO THE TEMPORARY SEDIMENT BASIN.

CONSTRUCTION WILL START IN DECEMBER 2014 WITH THE CONSTRUCTION OF PROPOSED DETENTION BASINS AND TEMPORARY SEDIMENT BASINS. FOLLOWING THE INSTALLATION OF ALL EROSION CONTROL ITEMS, DEMOLITION OF EXISTING STRUCTURES WILL BEGIN, FOLLOWED BY CONSTRUCTION OF THE PROPOSED SCHOOL BUILDING, ALL PROPOSED UTILITIES, AND ALL PROPOSED SITE IMPROVEMENTS. ACTIVITIES FOR CONSTRUCTION WILL INCLUDE MASS GRADING, EXCAVATION AND TRENCHING.

THE GENERAL CONSTRUCTION SEQUENCE IS AS FOLLOWS:

A. INSTALL PERIMETER EROSION CONTROL ITEMS AND INLET PROTECTION EXISTING STRUCTURES.
B. DEMOLISH EXISTING BUILDING AND PAVEMENT AREAS. REMOVE, CUT AND CAP ALL UTILITIES.
C. STRIP TOPSOIL AND UNSUITABLE MATERIAL ACROSS THE SITE. STOCKPILE TOPSOIL ONSITE AND MAINTAIN WITH TEMPORARY SEEDING.
D. INSTALL ALL TEMPORARY SEDIMENT CONTROLS WITHIN 24 HOURS FOLLOWING THE STRIPPING OPERATION. USE TEMPORARY DIVERSION CHANNELS TO ROUTE RUNOFF TO SEDIMENT BASIN PRIOR TO THE INSTALLATION OF THE PROPOSED STORM SEWER SYSTEM.
E. PERFORM MASS GRADING FOR BUILDING PAD AND PARKING AREAS.
F. INSTALL SITE UTILITIES AND INSTALL INLET PROTECTION STRUCTURES AS WORK PROGRESSES.
G. ANY DISTURBED OR EXPOSED AREAS SHALL BE STABILIZED PER OEPA TEMPORARY AND PERMANENT STABILIZATION REGULATIONS INCLUDING:
   1. SEEDING   2. DITCH MATTING   3. INLET PROTECTION
   4. MULCHING   5. WATERING
H. INSTALL FINAL PAVING AND PERMANENT SEEDING.
I. PROVIDE PERMANENT STABILIZATION FOR ANY DISTURBED AREAS AND REMOVE TEMPORARY SEDIMENT CONTROLS, PERIMETER CONTROLS, AND INLET PROTECTION. EXCAVATE ACCUMULATED SEDIMENT FROM SEDIMENT BASIN AND REMOVE SKIMMER DEVICE. STABILIZE DETENTION BASIN AREA.

STABILIZATION PRACTICES

PERMANENT SEEDING AND MULCHING STABILIZATION SHALL BE PROVIDED PER OEPA GUIDELINES AS SET FORTH IN PART II.B OF OHIO EPA PERMIT NO.: OHC000004. (SEE TABLE 1)

TABLE 1: PERMANENT STABILIZATION

AREA REQUIRING PERMANENT STABILIZATION	TIME FRAME TO APPLY EROSION CONTROLS
ANY AREAS THAT WILL LIE DORMANT FOR ONE YEAR OR MORE	WITHIN SEVEN DAYS OF THE MOST RECENT DISTURBANCE
ANY AREAS WITHIN 50 FEET OF A SURFACE WATER OF THE STATE AND AT FINAL GRADE	WITHIN TWO DAYS OF REACHING FINAL GRADE
ANY OTHER AREAS AT FINAL GRADE	WITHIN SEVEN DAYS OF REACHING FINAL GRADE WITHIN THAT AREA

TEMPORARY SEEDING AND MULCHING STABILIZATION SHALL BE PROVIDED PER OEPA GUIDELINES AS SET FORTH IN PART II.B OF OHIO EPA PERMIT NO.: OHCO00004. (SEE TABLE 2)

TABLE 2: TEMPORARY STABILIZATION

AREA REQUIRING TEMPORARY STABILIZATION	TIME FRAME TO APPLY EROSION CONTROLS
ANY DISTURBED AREAS WITH 50 FEET OF A SURFACE WATER OF THE STATE AND NOT AT FINAL GRADE	WITHIN TWO DAYS OF THE MOST RECENT DISTURBANCE IF THE AREA WILL REMAIN IDLE FOR MORE THAN 14 DAYS
FOR ALL CONSTRUCTION ACTIVITIES, ANY DISTURBED AREAS THAT WILL BE DORMANT FOR MORE THAN 14 DAYS BUT LESS THAN ONE YEAR, AND NOT WITHIN 50 FEET OF A SURFACE WATER OF THE STATE	WITHIN SEVEN DAYS OF THE MOST RECENT DISTURBANCE WITHIN THE AREA FOR RESIDENTIAL SUBDIVISIONS, DISTURBED AREAS MUST BE STABILIZED AT LEAST SEVEN DAYS PRIOR TO TRANSFER OF PERMIT COVERAGE FOR THE INDIVIDUAL LOT(S).
DISTURBED AREAS THAT WILL BE IDLE OVER WINTER	PRIOR TO THE ONSET OF WINTER WEATHER

ALL TEMPORARY EROSION AND SEDIMENT CONTROL INSTALLATIONS SHALL BE REMOVED WHEN 70% VEGETATION HAS BEEN REACHED.

SEEDING & MULCHING

MULCH AND/OR OTHER APPROPRIATE VEGETATIVE PRACTICES SHALL BE APPLIED TO DISTURBED AREAS WITHIN 7 DAYS OF GRADING IF THE AREA IS TO REMAIN DORMANT (UNDISTURBED) FOR MORE THAN 14 DAYS OR ON AREAS AND PORTIONS OF THE SITE WHICH CAN BE BROUGHT TO FINAL GRADE.

MULCH SHALL CONSIST OF UNROTTED SMALL GRAIN STRAW APPLIED AT THE RATE OF 3 TONS/AC. OR 138 LB./1000 SQ. FT. (TWO TO THREE BALES). THE STRAW MULCH SHALL BE SPREAD UNIFORMLY BY HAND OR MECHANICALLY SO THE SOIL SURFACE IS COVERED. FOR UNIFORM DISTRIBUTION OF HAND-SPREAD MULCH, DIVIDE AREA INTO APPROXIMATELY 1000-SQ.-FT. SECTIONS AND PLACE THREE 45-LB. BALES OF STRAW IN EACH SECTION.

MULCH SHALL BE ANCHORED IMMEDIATELY TO MINIMIZE LOSS BY WIND OR RUNOFF. THE FOLLOWING ARE ACCEPTABLE METHODS FOR ANCHORING MULCH:

1) MECHANICAL-USE A DISK, CRIMPER, OR SIMILAR TYPE TOOL SET STRAIGHT TO PUNCH OR ANCHOR THE MULCH MATERIAL INTO THE SOIL. STRAW MECHANICALLY ANCHORED SHALL NOT BE FINELY CHOPPED BUT BE LEFT GENERALLY LONGER THAN 6 IN.
2) MULCH NETTINGS-USE ACCORDING TO THE MANUFACTURER'S RECOMMENDATIONS, FOLLOWING ALL PLACEMENT AND ANCHORING SUGGESTIONS. USE IN AREAS OF WATER CONCENTRATION AND STEEP SLOPES TO HOLD MULCH IN PLACE.
3) ASPHALT EMULSION-FOR STRAW MULCH, APPLY AT THE RATE OF 160 GAL./AC. (0.1 GAL./SY) INTO THE MULCH AS IT IS BEING APPLIED OR AS RECOMMENDED BY THE MANUFACTURE.
4) SYNTHETIC BINDERS-FOR STRAW MULCH, SYNTHETIC BINDERS SUCH AS ACRYLIC DLR (AGRI-TAC), DCA-70, PETROSET, TERRA TACK OR EQUAL MAY BE USED AT RATES RECOMMENDED BY THE MANUFACTURER.

TEMPORARY SEEDING & MULCHING FOR EROSION CONTROL

SEED TYPE	PER 1000 SQ FT	PER ACRE
PERENNIAL RYEGRASS TALL FESCUE ANNUAL RYEGRASS	1 POUND 1 POUND 1 POUND	40 POUNDS 40 POUNDS 40 POUNDS
SMALL GRAIN STRAW	90 POUNDS	2 TONS
FERTILIZER	6 POUNDS OF 10-10-10 OR 12-12-12	250 POUNDS OF 10-10-10 OR 12-12-12

NOTE: OTHER APPROVED SPECIES MAY BE SUBSTITUTED

WINTER SEEDING & MULCHING

WINTER SEED AND MULCH IS REQUIRED FOR EARTH DISTURBANCE ACTIVITY OPERATIONS OCCURRING BETWEEN OCTOBER 15 AND MARCH 15 AND CAN ONLY BE INSTALLED DURING THAT TIME. ALL STRAW MULCH INCLUDED IN THIS WORK MUST BE EITHER CRIMPED IN PLACE OR INSTALLED WITH A BIODEGRADABLE BONDED FIBER MATRIX. CRIMPED MULCH IS REQUIRED TO BE ANCHORED INTO THE SOIL SURFACE WITH A MECHANICAL CRIMPING IMPLEMENT OR OTHER SUITABLE IMPLEMENT APPROVED BY THE ENGINEER. THE MULCH INCLUDED IN THIS WORK MUST BE CAPABLE OF PROVIDING SUFFICIENT DURABLE PROTECTIVE COVER THAT PROVIDES OEPA NPDES PERMIT COMPLIANT EROSION CONTROL FOR A MINIMUM OF 6 MONTHS. THE USE OF OTHER SEED AND/OR MULCH MATERIALS IN THIS TIME PERIOD REQUIRES SPECIFIC APPROVAL BY THE ENGINEER. THE USE OF WINTER SEEDING AND MULCHING IS NOT AN ACCEPTABLE PRACTICE FOR PROTECTING THE SUBGRADE SURFACE.

STOCKPILE

SILT FENCING SHALL BE INSTALLED AROUND TEMPORARY SPOIL STOCKPILES. THESE STOCKPILES SHALL BE STRAW MULCHED AND/OR TEMPORARILY SEEDED WITHIN 7 WORKING DAYS IF LEFT DORMANT FOR 14 DAYS OR LONGER.

TIMING OF CONTROLS/MEASURES

AS INDICATED IN THE SEQUENCE OF MAJOR ACTIVITIES, CONSTRUCTION ENTRANCE(S) AND SILT FENCE WILL BE CONSTRUCTED PRIOR TO CLEARING OR GRADING OF ANY OTHER PORTIONS OF THE SITE. SEDIMENT CONTROL DEVICES SHALL BE IMPLEMENTED FOR ALL AREAS REMAINING DISTURBED LONGER THAN 14 DAYS AND/OR WITHIN 7 DAYS OF ANY GRUBBING ACTIVITIES. AREAS WHERE CONSTRUCTION ACTIVITY TEMPORARILY CEASES FOR MORE THAN 14 DAYS WILL BE STABILIZED WITH A TEMPORARY SEED AND MULCH WITHIN 2 DAYS OF THE LAST DISTURBANCE IF THE AREA IS WITHIN 50 FEET OF A STREAM, AND WITHIN 7 DAYS OF THE LAST DISTURBANCE IF THE AREA IS MORE THAN 50 FEET AWAY FROM A STREAM. ONCE CONSTRUCTION ACTIVITY CEASES PERMANENTLY IN AN AREA, THAT AREA WILL BE STABILIZED WITH PERMANENT SEED AND MULCH. AFTER THE ENTIRE SITE IS STABILIZED, THE ACCUMULATED SEDIMENT WILL BE REMOVED FROM THE BASIN.

STABILIZATION TYPE	J	F	M	A	M	J	J	A	S	O	N	D
PERMANENT SEEDING			●	●	●	*	*	*	●	●		
DORMANT SEEDING	●	●	●							●	●	●
TEMPORARY SEEDING			●	●	●	*	*	*	●	●		
SODDING			**	**	**	**	**	**	**			
MULCHING	●	●	●	●	●	●	●	●	●	●	●	●

* - IRRIGATION NEEDED
** - IRRIGATION NEEDED FOR 2-3 WEEKS AFTER SOD IS APPLIED

INSPECTIONS

ALL BMPS ON THIS SITE SHALL BE INSPECTED BY THE CONTRACTOR OR DESIGNATED REPRESENTATIVE AT LEAST ONCE EVERY SEVEN CALENDAR DAYS AND WITHIN 24 HOURS AFTER A RAIN EVENT OF 0.5 INCHES PER 24 HOUR PERIOD. A RECORD OF THESE INSPECTIONS SHALL BE MAINTAINED IN THE CONSTRUCTION OFFICE WITH THE SWPPP FOR PUBLIC VIEWING. ANY VIOLATIONS WILL BE REPORTED THROUGH THE PROJECT PERSONNEL. A RAIN GAUGE WILL BE LOCATED WITHIN THE PROJECT LIMITS.

FOLLOWING EACH INSPECTION, A CHECKLIST MUST BE COMPLETED AND SIGNED BY THE QUALIFIED INSPECTION PERSONNEL REPRESENTATIVE. AT A MINIMUM, THE INSPECTION REPORT SHALL INCLUDE:

I. THE INSPECTION DATE;
II. NAMES, TITLES, AND QUALIFICATIONS OF PERSONNEL MAKING THE INSPECTION;
III. WEATHER INFORMATION FOR THE PERIOD SINCE THE LAST INSPECTION (OR SINCE COMMENCEMENT OF CONSTRUCTION ACTIVITY IF THE FIRST INSPECTION) INCLUDING A BEST ESTIMATE OF THE BEGINNING OF EACH STORM EVENT, DURATION OF EACH STORM EVENT, APPROXIMATE AMOUNT OF RAINFALL FOR EACH STORM EVENT (IN INCHES), AND WHETHER ANY DISCHARGES OCCURRED;
IV. WEATHER INFORMATION AND A DESCRIPTION OF ANY DISCHARGES OCCURRING AT THE TIME OF THE INSPECTION;
V. LOCATION(S) OF DISCHARGES OF SEDIMENT OR OTHER POLLUTANTS FROM THE SITE;
VI. LOCATION(S) OF BMPS THAT NEED TO BE MAINTAINED;
VII. LOCATION(S) OF BMPS THAT FAILED TO OPERATE AS DESIGNED OR PROVED INADEQUATE FOR A PARTICULAR LOCATION;
VIII. LOCATION(S) WHERE ADDITIONAL BMPS ARE NEEDED THAT DID NOT EXIST AT THE TIME OF INSPECTION; AND
IX. CORRECTIVE ACTION REQUIRED INCLUDING ANY CHANGES TO THE SWP3 NECESSARY AND IMPLEMENTATION DATES.

THE PERMITTEE SHALL MAINTAIN A RECORD OF ALL INSPECTIONS FOR A PERIOD OF 3 YEARS FOLLOWING THE SUBMITTAL OF THE NOTICE OF TERMINATION.

MAINTENANCE

THE CONTRACTOR SHALL MAINTAIN, REPAIR, OR REPLACE ALL EROSION CONTROL INSTALLATIONS AS NEEDED TO ENSURE THE CONTINUED PERFORMANCE OF THEIR INTENDED FUNCTION. ALL REPAIRS TO BMPS SHALL BE MADE WITHIN 3 DAYS (OR SOONER IF POSSIBLE) OF NOTIFICATION OF DEFICIENCIES. IF THE CORRECTIONS ARE NOT MADE WITHIN THE 3 DAY PERIOD, LIQUIDATED DAMAGES MAY BE ASSESSED AS PER THE ODOT CMS SECTION 108.27.

ONGOING INSPECTION OF INSTALLATIONS WILL BE PERFORMED BY THE CONTRACTOR OR DESIGNATED REPRESENTATIVE.

ANY TRAPPED SEDIMENT OR DEBRIS REMOVED DURING CLEANING OF OR REMOVAL OF BMP INSTALLATIONS SHALL BE PLACED IN AREAS NOT SUBJECT TO EROSION AND PERMANENTLY STABILIZED.

SPILL PREVENTION

MATERIAL MANAGEMENT PRACTICES:

THE FOLLOWING ARE THE MATERIAL MANAGEMENT PRACTICES THAT WILL BE USED TO REDUCE THE RISK OF SPILLS OR OTHER ACCIDENTAL EXPOSURE OF MATERIALS AND SUBSTANCES TO STORM WATER RUNOFF.

GOOD HOUSEKEEPING:

THE FOLLOWING GOOD HOUSEKEEPING PRACTICES WILL BE FOLLOWED ONSITE DURING THE CONSTRUCTION PROJECT.

1. AN EFFORT WILL BE MADE TO STORE ONLY ENOUGH PRODUCT REQUIRED TO DO THE JOB.
2. ALL MATERIALS STORED ONSITE WILL BE STORED IN A NEAT, ORDERLY MANNER IN THEIR APPROPRIATE CONTAINERS AND, IF POSSIBLE, UNDER A ROOF OR OTHER ENCLOSURE.
3. PRODUCTS WILL BE KEPT IN THEIR ORIGINAL CONTAINERS WITH THE ORIGINAL MANUFACTURER'S LABEL.
4. SUBSTANCES WILL NOT BE MIXED WITH ONE ANOTHER UNLESS RECOMMENDED BY THE MANUFACTURER.
5. WHENEVER POSSIBLE, ALL OF A PRODUCT WILL BE USED UP BEFORE DISPOSING OF THE CONTAINER.
6. MANUFACTURERS' RECOMMENDATIONS FOR PROPER USE AND DISPOSAL WILL BE FOLLOWED.
7. THE SITE SUPERINTENDENT WILL INSPECT DAILY TO ENSURE PROPER USE AND DISPOSAL OF MATERIALS ONSITE.

HAZARDOUS PRODUCTS:

THESE PRACTICES ARE USED TO REDUCE THE RISKS ASSOCIATED WITH HAZARDOUS MATERIALS.

1. PRODUCTS WILL BE KEPT IN ORIGINAL CONTAINERS UNLESS THEY ARE NOT RESEALABLE.
2. ORIGINAL LABELS AND MATERIAL SAFETY DATA WILL BE RETAINED; THEY CONTAIN IMPORTANT PRODUCT INFORMATION.
3. IF SURPLUS PRODUCT MUST BE DISPOSED OF, MANUFACTURERS' OR LOCAL AND STATE RECOMMENDED METHODS FOR PROPER DISPOSAL WILL BE FOLLOWED.

SPILL CONTROL PRACTICES

IN ADDITION TO THE GOOD HOUSEKEEPING AND MATERIAL MANAGEMENT PRACTICES DISCUSSED IN THE PREVIOUS SECTIONS OF THIS PLAN, THE FOLLOWING PRACTICES WILL BE FOLLOWED FOR SPILL PREVENTION AND CLEANUP:

1. ALL SPILLS SHALL BE CLEANED UP IMMEDIATELY AFTER DISCOVERY. MANUFACTURERS' RECOMMENDED METHODS FOR SPILL CLEANUP POSTED AND SITE PERSONNEL WILL BE MADE AWARE OF THE PROCEDURES AND THE LOCATION OF THE INFORMATION AND CLEANUP SUPPLIES.
2. MATERIALS AND EQUIPMENT NECESSARY FOR SPILL CLEANUP WILL BE KEPT IN THE MATERIAL STORAGE AREA ONSITE. EQUIPMENT AND MATERIALS WILL INCLUDE BUT NOT BE LIMITED TO BROOMS, DUST PANS, MOPS, RAGS, GLOVES, GOGGLES, KITTY LITTER, SAND, SAWDUST, AND PLASTIC AND METAL TRASH CONTAINERS SPECIFICALLY FOR THIS PURPOSE.
3. THE SPILL AREA WILL BE KEPT WELL VENTILATED AND PERSONNEL WILL WEAR APPROPRIATE PROTECTIVE CLOTHING TO PREVENT INJURY FROM CONTACT WITH A HAZARDOUS SUBSTANCE.
4. SPILLS OF TOXIC OR HAZARDOUS MATERIAL WILL BE REPORTED TO THE APPROPRIATE STATE OR LOCAL GOVERNMENT AGENCY, REGARDLESS OF THE SIZE. SPILLS OF 25 OR MORE GALLONS OF PETROLEUM WASTE MUST BE REPORTED TO OHIO EPA (1-800-282-9378), THE LOCAL FIRE DEPARTMENT, AND THE LOCAL EMERGENCY PLANNING COMMITTEE WITHIN 30 MINUTES OF THE SPILL.
5. SOILS CONTAMINATED BY PETROLEUM OR OTHER CHEMICAL SPILLS MUST BE TREATED/DISPOSED AT AN OHIO EPA APPROVED SOLID WASTE MANAGEMENT FACILITY OR HAZARDOUS WASTE TREATMENT, STORAGE OR DISPOSAL FACILITY (TSDF).
6. THE SPILL PREVENTION PLAN WILL BE ADJUSTED TO INCLUDE MEASURES TO PREVENT THIS TYPE OF SPILL FROM REOCCURRING AND HOW TO CLEAN UP THE SPILL IF THERE IS ANOTHER ONE. A DESCRIPTION OF THE SPILL, WHAT CAUSED IT, AND THE CLEANUP MEASURES WILL ALSO BE INCLUDED.
7. THE SITE SUPERINTENDENT RESPONSIBLE FOR THE DAY-TO-DAY SITE OPERATIONS, WILL BE THE SPILL PREVENTION AND CLEANUP COORDINATOR. HE WILL DESIGNATE SITE PERSONNEL WHO WILL RECEIVE SPILL PREVENTION AND CLEANUP TRAINING. THESE INDIVIDUALS WILL EACH BECOME RESPONSIBLE FOR A PARTICULAR PHASE OF PREVENTION AND CLEANUP. THE NAMES OF RESPONSIBLE SPILL PERSONNEL WILL BE POSTED IN THE MATERIAL STORAGE AREA AND IN THE OFFICE TRAILER ONSITE.

PRODUCT SPECIFIC PRACTICES

THE FOLLOWING PRODUCT SPECIFIC PRACTICES WILL BE FOLLOWED ONSITE:

PETROLEUM PRODUCTS - ALL ONSITE VEHICLES WILL BE MONITORED FOR LEAKS AND RECEIVE REGULAR PREVENTIVE MAINTENANCE TO REDUCE THE CHANCE OF LEAKAGE. PETROLEUM PRODUCTS WILL BE STORED IN TIGHTLY SEALED CONTAINERS WHICH ARE CLEARLY LABELED. ANY ASPHALT SUBSTANCES USED ONSITE WILL BE APPLIED ACCORDING TO THE MANUFACTURER'S RECOMMENDATIONS.

FUEL STORAGE TANKS SHALL BE LOCATED AWAY FROM SURFACE WATERS AND STORM SEWER SYSTEM INLETS. FUEL TANKS SHALL BE STORED IN A DIKED AREA CAPABLE OF HOLDING 150% OF THE TANK CAPACITY.

FERTILIZERS - FERTILIZERS USED WILL BE APPLIED ONLY IN THE MINIMUM AMOUNTS RECOMMENDED BY THE MANUFACTURER. ONCE APPLIED, FERTILIZER WILL BE WORKED INTO THE SOIL TO LIMIT EXPOSURE TO STORM WATER. STORAGE WILL BE IN A COVERED SHED. THE CONTENTS OF ANY PARTIALLY USED BAGS OF FERTILIZER WILL BE TRANSFERRED TO A SEALABLE PLASTIC BIN TO AVOID SPILLS.

PAINTS - ALL CONTAINERS WILL BE TIGHTLY SEALED AND STORED WHEN NOT REQUIRED FOR USE. EXCESS PAINT WILL NOT BE DISCHARGED TO THE STORM SEWER SYSTEM BUT WILL BE PROPERLY DISPOSED OF ACCORDING TO MANUFACTURERS' INSTRUCTIONS OR STATE AND LOCAL REGULATIONS.

CONCRETE TRUCKS - CONCRETE TRUCKS WILL NOT BE ALLOWED TO WASH OUT OR DISCHARGE SURPLUS CONCRETE OR DRUM WASH WATER ON THE SITE.

DUST CONTROL

DUST CONTROL INVOLVES PREVENTING OR REDUCING DUST FROM EXPOSED SOILS OR OTHER SOURCES DURING LAND DISTURBING, DEMOLITION AND CONSTRUCTION ACTIVITIES TO REDUCE THE PRESENCE OF AIRBORNE SUBSTANCES WHICH MAY PRESENT HEALTH HAZARDS, TRAFFIC SAFETY PROBLEMS OR HARM ANIMAL OR PLANT LIFE.

THE FOLLOWING SPECIFICATIONS FOR DUST CONTROL SHALL BE FOLLOWED ONSITE:

1. VEGETATIVE COVER AND/MULCH - APPLY TEMPORARY OR PERMANENT SEEDING AND MULCH TO AREAS THAT WILL REMAIN IDLE FOR OVER 14 DAYS. SAVING EXISTING TREES AND LARGE SHRUBS WILL ALSO REDUCE SOIL AND AIR MOVEMENT ACROSS DISTURBED AREAS. SEE TEMPORARY SEEDING; PERMANENT SEEDING; MULCHING PRACTICES; AND TREE AND NATURAL AREA PROTECTION PRACTICES.
2. WATERING - SPRAY SITE WITH WATER UNTIL THE SURFACE IS WET BEFORE AND DURING GRADING AND REPEAT AS NEEDED, ESPECIALLY ON HAUL ROADS AND OTHER HEAVY TRAFFIC ROUTES. WATERING SHALL BE DONE AT A RATE THAT PREVENTS DUST BUT DOES NOT CAUSE SOIL EROSION. WETTING AGENTS SHALL BE UTILIZED ACCORDING TO MANUFACTURERS INSTRUCTIONS.
3. SPRAY-ON ADHESIVES - APPLY ADHESIVE ACCORDING TO THE FOLLOWING TABLE OR MANUFACTURERS' INSTRUCTIONS.

I CERTIFY UNDER PENALTY OF LAW THAT THIS DOCUMENT AND ALL ATTACHMENTS WERE PREPARED UNDER MY DIRECTION OR SUPERVISION IN ACCORDANCE WITH A SYSTEM DESIGNED TO ASSURE THAT QUALIFIED PERSONNEL PROPERLY GATHERED AND EVALUATED THE INFORMATION SUBMITTED. BASED ON MY INQUIRY OF THE PERSON OR PERSONS WHO MANAGE THE SYSTEM OR THOSE PERSONS DIRECTLY RESPONSIBLE FOR GATHERING THE INFORMATION, THE INFORMATION SUBMITTED IS, TO THE BEST OF MY KNOWLEDGE AND BELIEF, TRUE, ACCURATE AND COMPLETE. I AM AWARE THAT THERE ARE SIGNIFICANT PENALTIES FOR SUBMITTING FALSE INFORMATION, INCLUDING THE POSSIBILITY OF FINE AND IMPRISONMENT FOR KNOWING VIOLATIONS.

______________________________ ________
SITE SUPERINTENDENT   DATE
COMPANY

STATE OF OHIO
MICHAEL J. COUVREUR
E-70851
REGISTERED
PROFESSIONAL ENGINEER

THE KLEINGERS GROUP
CIVIL ENGINEERING
SURVEYING
LANDSCAPE ARCHITECTURE
www.kleingers.com
350 Worthington Rd, Ste B
Westerville, OH 43082
614.882.4311

SHP LEADING DESIGN
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236 High Street, Hamilton, Ohio 45011 — 513-863-5441
250 Civic Center Drive, Columbus, Ohio 43215 — Suite 200, 614-223-2124
1675 Broadway, Denver, Colorado 80202 — Suite 1300, 303-209-7866

City Administrator ____________
Service Director ____________
Review for the City of Grove City ____________
Jackson Township Fire Department ____________

DEVELOPMENT PLAN
CITY PROJECT NO. ____________

HIGHLAND PARK ELEMENTARY SCHOOL
2600 Cameron Street., Grove City, Ohio 43123

SOUTH-WESTERN CITY SCHOOL DISTRICT
3805 Marlane Drive, Grove City, OH 43123

EROSION CONTROL NOTES

DATE 07/23/14

C102

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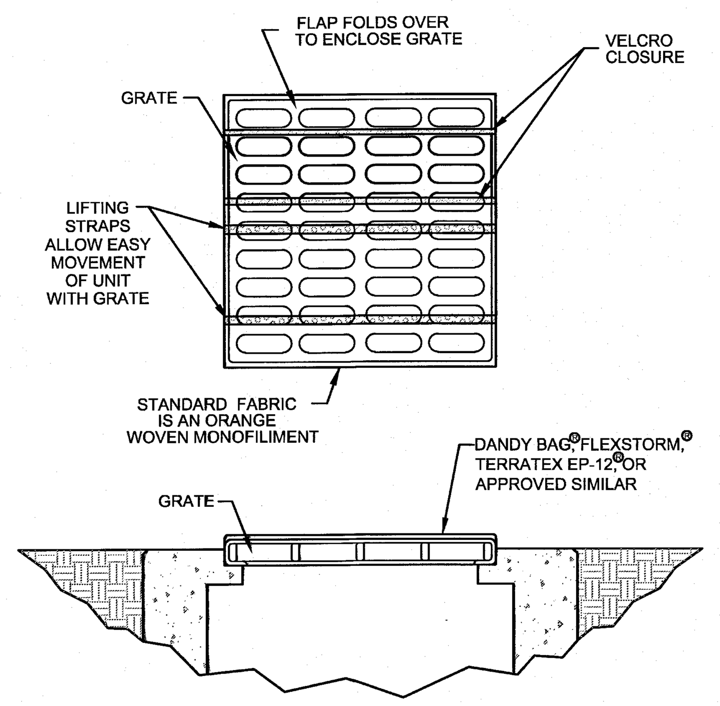


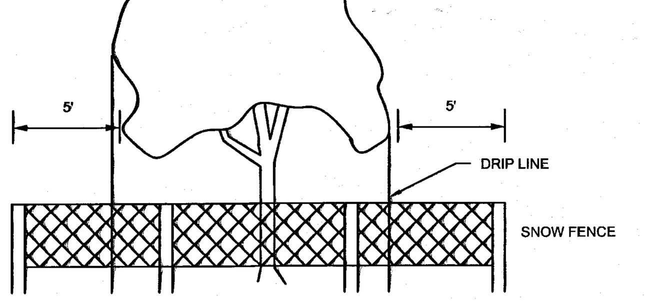
DANDY BAG®*
N.T.S.

INSTALLATION AND MAINTENANCE GUIDELINES

INSTALLATION: THE EMPTY DANDY BAG® SHOULD BE PLACED OVER THE GRATE AS THE GRATE STANDS ON END. IF USING OPTIONAL OIL ABSORBENTS; PLACE ABSORBENT PILLOW IN POUCH, ON THE BOTTOM (BELOW-GRADE SIDE) OF THE UNIT. ATTACH ABSORBENT PILLOW TO TETHER LOOP. TUCK THE ENCLOSURE FLAP INSIDE TO COMPLETELY ENCLOSE THE GRATE. HOLDING THE LIFTING DEVICES (DO NOT RELY ON LIFTING DEVICES TO SUPPORT THE ENTIRE WEIGHT OF THE GRATE), PLACE THE GRATE INTO ITS FRAME.

MAINTENANCE: REMOVE ALL ACCUMULATED SEDIMENT AND DEBRIS FROM SURFACE AND VICINITY OF UNIT AFTER EACH STORM EVENT. REMOVE SEDIMENT THAT HAS ACCUMULATED WITHIN THE CONTAINMENT AREA OF THE DANDY BAG® AS NEEDED. IF USING OPTIONAL OIL ABSORBENTS; REMOVE AND REPLACE ABSORBENT PILLOW WHEN NEAR SATURATION.

* FLEXSTORM®, TERRATEX EP-12® OR APPROVED EQUAL MAY BE USED IN LIEU OF DANDY BAG®

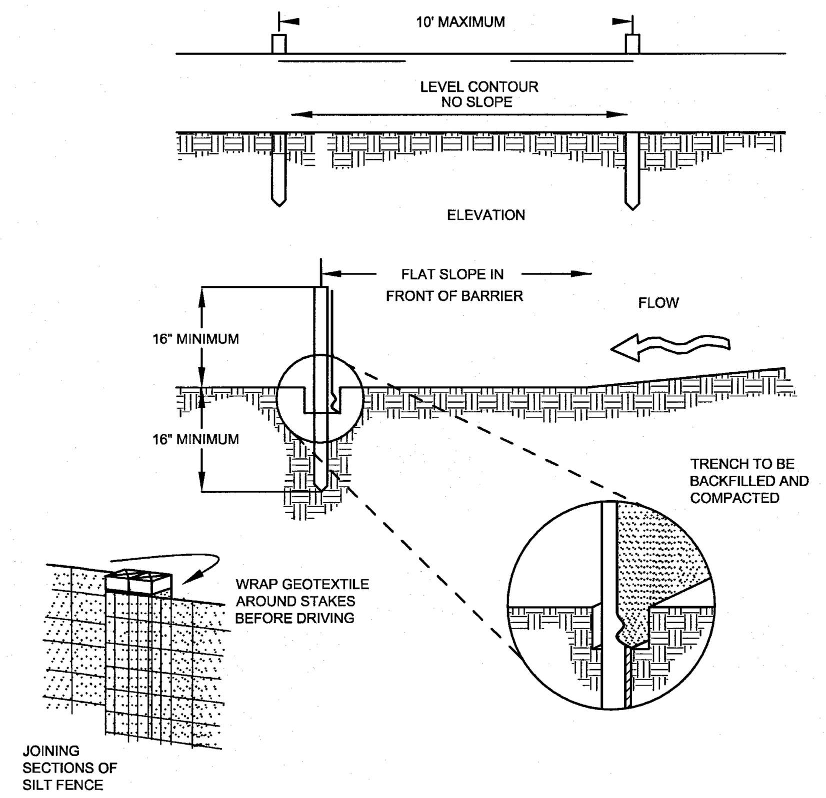


PROTECT EXISTING TREES AND OTHER VEGETATION INDICATED TO REMAIN IN PLACE AGAINST UNNECESSARY CUTTING, BREAKING OR SKINNING OF ROOTS, SKINNING OR BRUISING OF BARK, SMOTHERING OF TREES BY STOCKPILING CONSTRUCTION MATERIALS OR EXCAVATED MATERIALS WITHIN DRIP LINE, EXCESS FOOT OR VEHICULAR TRAFFIC, OR PARKING OF VEHICLES WITHIN DRIP LINE. PROVIDE TEMPORARY GUARDS TO PROTECT TREES AND AND VEGETATION TO BE LEFT STANDING.

PROTECTION OF EXISTING TREES AND VEGETATION
N.T.S.

NOTES:

1. SIGNAGE SHALL CLEARLY IDENTIFY THE TREE AND NATURAL PRESERVATION AREA AND STATE THAT NO CLEARING OR EQUIPMENT IS ALLOWED WITHIN IT.
2. TREE AND NATURAL PRESERVATION AREA SHALL BE FENCED PRIOR TO BEGINNING CLEARING OPERATIONS.
3. FENCE MATERIALS SHALL BE METAL FENCE POSTS WITH SNOW FENCE.
4. FENCE SHALL BE PLACED AS SHOWN ON PLANS AND BEYOND THE DRIP LINE OR CANOPY OF TREES TO BE PROTECTED.
5. IF ANY CLEARING IS DONE AROUND SPECIMEN TREES IT SHALL BE DONE BY CUTTING AT GROUND LEVEL WITH HAND HELD TOOLS AND SHALL NOT BE GRUBBED OR PULLED OUT. NO CLEARING SHALL BE DONE IN BUFFER STRIPS OR OTHER PRESERVED FORESTED AREAS.
6. NO FILLING OR STOCKPILING OF MATERIALS SHALL OCCUR WITHIN THE TREE PROTECTION AREA, INCLUDING DEPOSITION OF SEDIMENT.
7. WHERE UTILITIES MUST RUN THROUGH A TREE'S DRIP LINE, TUNNELING SHOULD BE USED TO MINIMIZE ROOT DAMAGE. TUNNELING SHOULD BE AT A MINIMUM DEPTH OF 24 INCHES FOR TREES LESS THAN 12 INCHES IN DIAMETER OR AT A MINIMUM DEPTH OF 36 INCHES FOR LARGER DIAMETER TREES.
8. WHERE TUNNELING WILL BE PERFORMED WITHIN THE DRIP LINE OF A TREE, THE TUNNEL SHOULD BE PLACED A MINIMUM OF 2 FEET AWAY FROM THE TREE TRUNK TO AVOID TAPROOTS.
9. MINIMIZE EXCAVATION OR TRENCHING WITHIN THE DRIP LINE OF THE TREE. ROUTE TRENCHES AROUND THE DRIP LINE OF TREES.
10. ROOTS 2 INCHES OR LARGER THAT ARE SEVERED BY TRENCHING SHOULD BE SAWN OFF NEATLY IN ORDER TO ENCOURAGE NEW GROWTH AND DISCOURAGE DECAY.
11. SOIL EXCAVATED DURING TRENCHING SHALL BE PILED ON THE SIDE AWAY FROM THE TREE.
12. ROOTS SHALL BE KEPT MOIST WHILE TRENCHES ARE OPEN AND REFILLED IMMEDIATELY AFTER UTILITIES ARE INSTALLED OR REPAIRED.
13. ARBORIST TO DELINEATE DRIP LINE OF TREES TO REMAIN, TO PROTECT WITH FENCING. DO NOT ALLOW WATER PONDING WITHIN DRIP LINE.



SILT FENCE (SF)
N.T.S.

NOTES:

1. SILT FENCE SHALL BE CONSTRUCTED BEFORE UPSLOPE LAND DISTURBANCE BEGINS.
2. ALL SILT FENCE SHALL BE PLACED AS CLOSE TO THE CONTOUR AS POSSIBLE SO THAT WATER WILL NOT CONCENTRATE AT LOW POINTS IN THE FENCE AND SO THAT SMALL SWALES OR DEPRESSIONS WHICH MAY CARRY SMALL CONCENTRATED FLOWS TO THE SILT FENCE ARE DISSIPATED ALONG ITS LENGTH.
3. ENDS OF THE SILT FENCES SHALL BE BROUGHT UPSLOPE SLIGHTLY SO THAT WATER PONDED BY THE SILT FENCE WILL BE PREVENTED FROM FLOWING AROUND THE ENDS.
4. SILT FENCE SHALL BE PLACED ON THE FLATTEST AREA AVAILABLE.
5. WHERE POSSIBLE, VEGETATION SHALL BE PRESERVED FOR 5 FT. (OR AS MUCH AS POSSIBLE) UPSLOPE FROM THE SILT FENCE. IF VEGETATION IS REMOVED, IT SHALL BE REESTABLISHED WITHIN 7 DAYS FROM THE INSTALLATION OF THE SILT FENCE.
6. THE HEIGHT OF THE SILT FENCE SHALL BE A MINIMUM OF 16 IN. ABOVE THE ORIGINAL GROUND SURFACE.
7. THE SILT FENCE SHALL BE PLACED IN AN EXCAVATED OR SLICED TRENCH CUT A MINIMUM OF 6 IN. DEEP. THE TRENCH SHALL BE CUT WITH A TRENCHER, CABLE LAYING MACHINE, OR OTHER SUITABLE DEVICE WHICH WILL ENSURE AN ADEQUATELY UNIFORM TRENCH DEPTH.
8. THE SILT FENCE SHALL BE PLACED WITH THE STAKES ON THE DOWNSLOPE SIDE OF THE GEOTEXTILE. A MINIMUM OF 8 IN. OF GEOTEXTILE MUST BE BELOW THE GROUND SURFACE. EXCESS MATERIAL SHALL LAY ON THE BOTTOM OF THE 6-IN.-DEEP TRENCH. THE TRENCH SHALL BE BACKFILLED AND COMPACTED ON BOTH SIDES OF THE FABRIC.
9. SEAMS BETWEEN SECTION OF SILT FENCE SHALL BE SPLICED TOGETHER ONLY AT A SUPPORT POST WITH A MINIMUM 6 IN. OVERLAP PRIOR TO DRIVING INTO THE GROUND, (SEE DETAIL).
10. MAINTENANCE--SILT FENCE SHALL ALLOW RUNOFF TO PASS ONLY AS DIFFUSE FLOW THROUGH THE GEOTEXTILE. IF RUNOFF OVERTOPS THE SILT FENCE, FLOWS UNDER THE FABRIC OR AROUND THE FENCE ENDS, OR IN ANY OTHER WAY BECOMES A CONCENTRATED FLOW DISCHARGE, ONE OF THE FOLLOWING SHALL BE PERFORMED, AS APPROPRIATE: 1) THE LAYOUT OF THE SILT FENCE SHALL BE CHANGED, 2) ACCUMULATED SEDIMENT SHALL BE REMOVED, OR 3) OTHER PRACTICES SHALL BE INSTALLED.

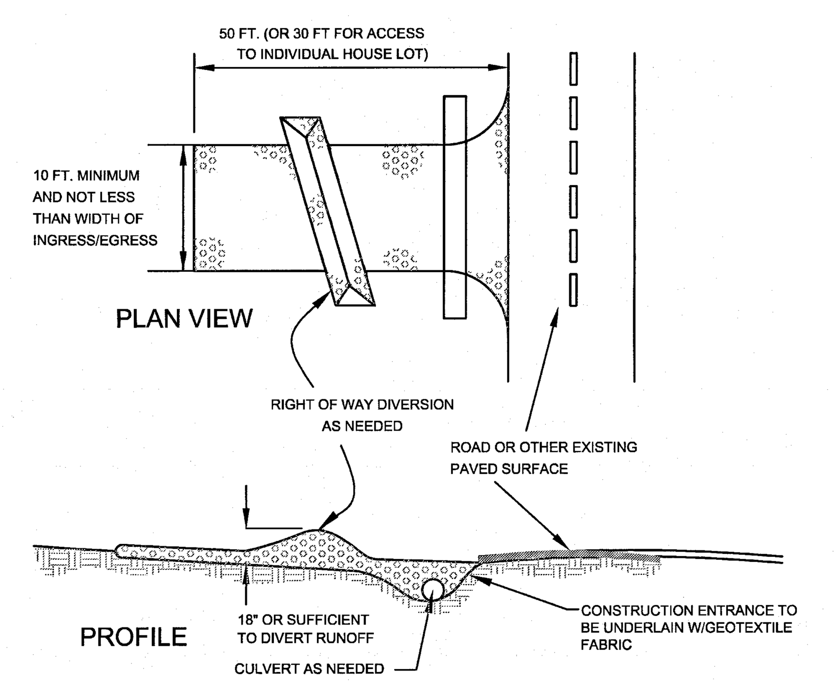
CRITERIA FOR SILT FENCE MATERIALS

1. FENCE POSTS--THE LENGTH SHALL BE A MINIMUM OF 32 IN. LONG. WOOD POSTS WILL BE 2-BY-2-IN. NOMINAL DIMENSIONED HARDWOOD OF SOUND QUALITY. THEY SHOULD BE FREE OF KNOTS, SPLITS, AND OTHER VISIBLE IMPERFECTIONS, THAT WILL WEAKEN THE POSTS. THE MAXIMUM SPACING BETWEEN POSTS SHALL BE 10 FT. POSTS SHALL BE DRIVEN A MINIMUM OF 16 IN. INTO THE GROUND, WHERE POSSIBLE. IF NOT POSSIBLE, THE POSTS SHALL BE ADEQUATELY SECURED TO PREVENT OVERTURNING OF THE FENCE DUE TO SEDIMENT/WATER LOADING.
2. SILT FENCE FABRIC SHALL BE ODOT TYPE C GEOTEXTILE FABRIC OR AS DESCRIBED IN THE CHART BELOW:

FABRIC PROPERTIES AND TESTING METHOD

MINIMUM TENSILE STRENGTH	120 LBS, ASTM D 4632
MAXIMUM ELONGATION AT 60 LBS	50%, ASTM D 4632
MINIMUM PUNCTURE STRENGTH	50 LBS, ASTM D 4833
MINIMUM TEAR STRENGTH	40 LBS, ASTM D 4533
APPARENT OPENING SIZE	< 0.84MM, ASTM D 4751
MINIMUM PERMITTIVITY	$1X10^{-2}$ SEC^{-1}, ASTM D 4491
ULTRAVIOLET EXPOSURE STRENGTH RETENTION	70%, ASTM G 4355

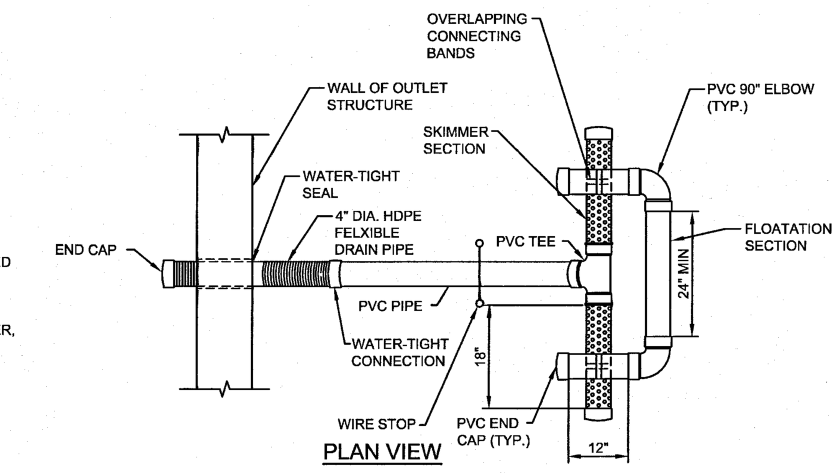
* STRAW WATTLES MAY BE USED INSTEAD OF SILT FENCE.

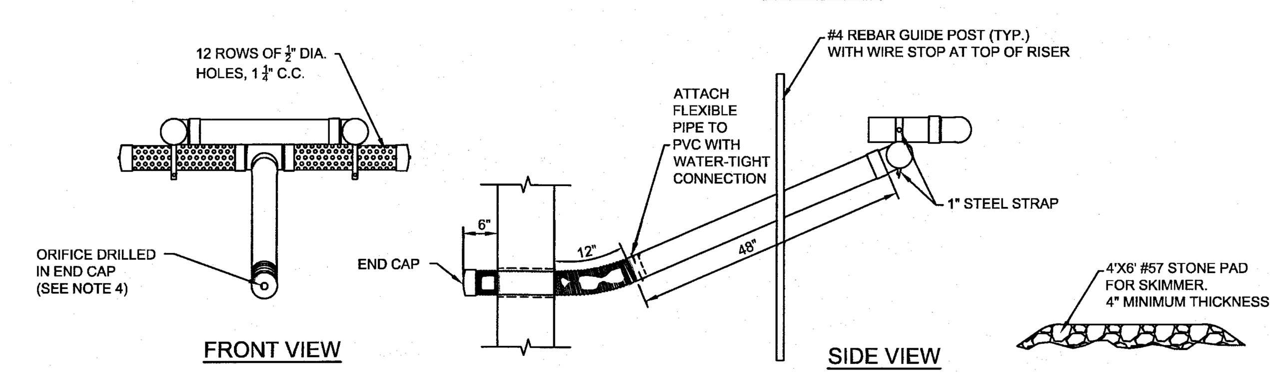


CONSTRUCTION ENTRANCE (SCD 2230)

1. STONE SIZED--TWO-INCH STONE SHALL BE USED, OR RECYCLED CONCRETE EQUIVALENT.
2. LENGTH--THE CONSTRUCTION ENTRANCE SHALL BE AS LONG AS REQUIRED TO STABILIZE HIGH TRAFFIC AREA BUT NOT LESS THAN 50 FT. (EXCEPT ON SINGLE RESIDENCE LET WHERE A 30-FT. MINIMUM LENGTH APPLIES).
3. THICKNESS--THE STONE LAYER SHALL BE BE AT LEAST 6 IN. THICK.
4. WIDTH--THE ENTRANCE SHALL BE AT LEAST 10 FT. WIDE, BUT NOT LESS THAN THE FULL WIDTH AT POINTS WHERE INGRESS OR EGRESS OCCURS.
5. BEDDING--A GEOTEXTILE SHALL BE PLACED OVER THE ENTIRE AREA PRIOR TO PLACING THE STONE. IT SHALL HAVE A GRAB TENSILE STRENGTH OF AT LEAST 200 LB. AND A MULLEN BURST STRENGTH OF AT LEAST 190 LB.
6. CULVERT--A PIPE OR CULVERT SHALL BE CONSTRUCTED UNDER THE ENTRANCE IF NEEDED TO PREVENT SURFACE WATER FLOWING ACROSS THE ENTRANCE FROM BEING DIRECTED OUT ONTO PAVED SURFACES.
7. WATER BAR--A WATER BAR SHALL BE CONSTRUCTED AS PART OF THE CONSTRUCTION ENTRANCE IF NEEDED TO PREVENT SURFACE RUNOFF FROM FLOWING THE LENGTH OF THE CONSTRUCTION ENTRANCE AND OUT ONTO PAVED SURFACES,
8. MAINTENANCE--TOP DRESSING OF ADDITIONAL STONE SHALL BE APPLIED AS CONDITIONS DEMAND. MUD SPILLED, DROPPED, WASHED OR TRACKED ONTO PUBLIC ROADS, OR ANY SURFACE WHERE RUNOFF IS NOT CHECKED BY SEDIMENT CONTROLS, SHALL BE REMOVED IMMEDIATELY. REMOVAL SHALL BE ACCOMPLISHED BY SCRAPING OR SWEEPING.
9. CONSTRUCTION ENTRANCES SHALL NOT BE RELIED UPON TO REMOVE MUD FROM VEHICLES AND PREVENT OFF-SITE TRACKING. VEHICLES THAT ENTER AND LEAVE THE CONSTRUCTION-SITE SHALL BE RESTRICTED FROM MUDDY AREAS.
10. CONSTRUCTION ENTRANCE SIGN--A "CONSTRUCTION ENTRANCE AHEAD" SIGN WILL BE NEEDED FOR EACH DIRECTION, PRIOR TO THE ENTRANCE.

NOTES:
1). ALL P.V.C. PIPES ARE TO BE 4" I.D. SCHEDULE 40
2). ALL JOINTS OF THE FLOATATION SECTION SHALL BE GLUED TOGETHER AND WATER-TIGHT. JOINTS OF SKIMMER SECTION NEED NOT TO BE WATER-TIGHT.
3). 4" HDPE FLEXIBLE DRAIN PIPE IS TO BE ATTACHED TO THE OUTLET STRUCTURE WITH WATER-TIGHT CONNECTIONS. FOR CORRUGATED METAL RISER, STUB SHALL BE SCHEDULE 40 STEEL PIPE TACK WELDED TO CREATE A WATER-TIGHT SEAL. FOR CONCRETE RISER, STUB SHALL BE SCHEDULE 40 P.V.C. PIPE GROUTED TO CREATE A WATER-TIGHT SEAL.
4.) ORIFICE IS TO BE SIZED FOR A MINIMUM 48-HOUR DEWATERING TIME.

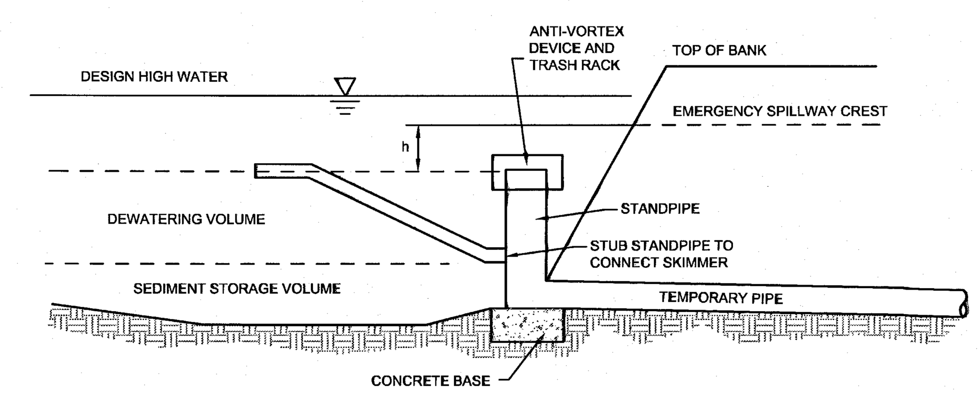




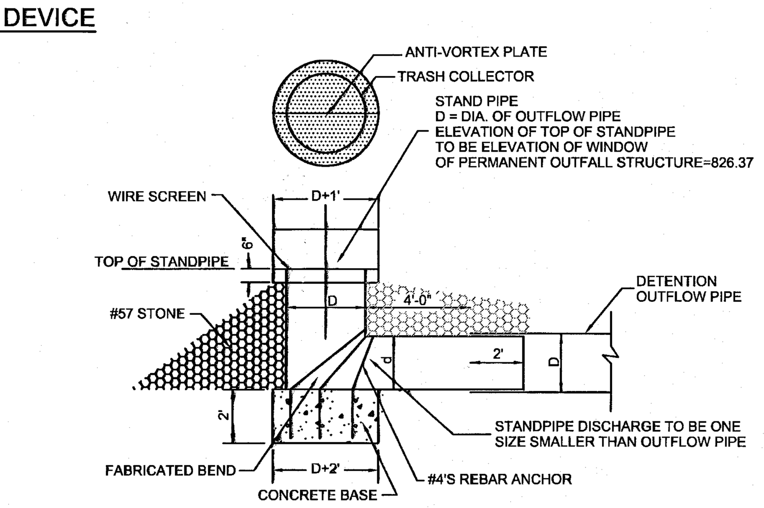
TEMPORARY SEDIMENT BASIN 001 DEWATERING VOLUME
1800 CF PER ACRE OF TOTAL DISTURBED AREA
1800 CF/AC * 6.99 AC = 12,582 CF
1.50" ORIFICE ELEVATION = 801.50
TOP OF BASIN ELEVATION = 804.00
VOLUME PROVIDED = 12,799 CF
DRAWDOWN TIME = 2.90 DAYS

TEMPORARY SEDIMENT BASIN 001 SEDIMENT VOLUME
1000 CF PER ACRE OF TOTAL DISTURBED AREA
1000 CF/AC * 6.99 AC = 6,990 CF
1.50" ORIFICE ELEVATION = 801.5
BOTTOM OF BASIN ELEVATION = 798.00
VOLUME PROVIDED = 9,150 CF

SKIMMER DEWATERING DEVICE
N.T.S.

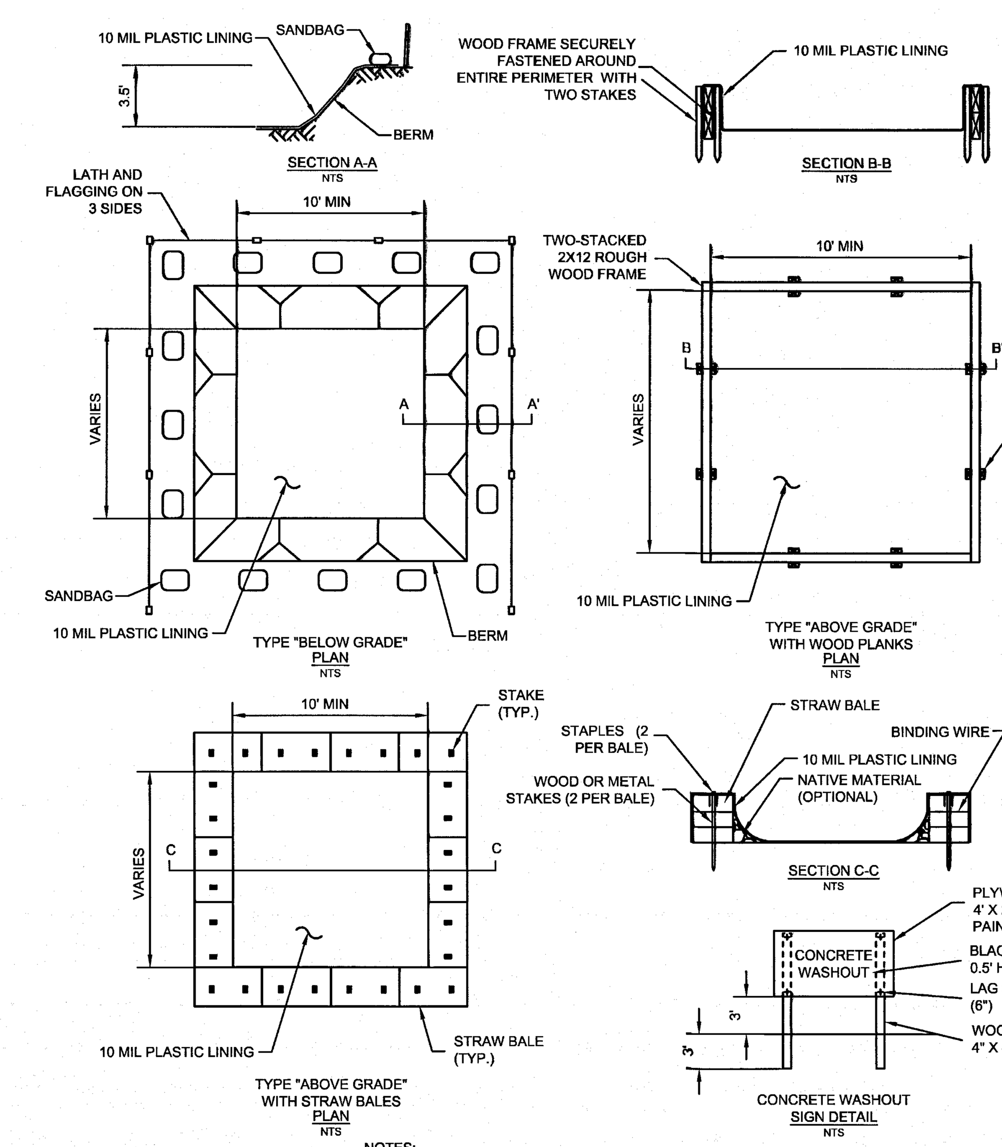


SEDIMENT BASIN OUTLET DETAIL
NTS



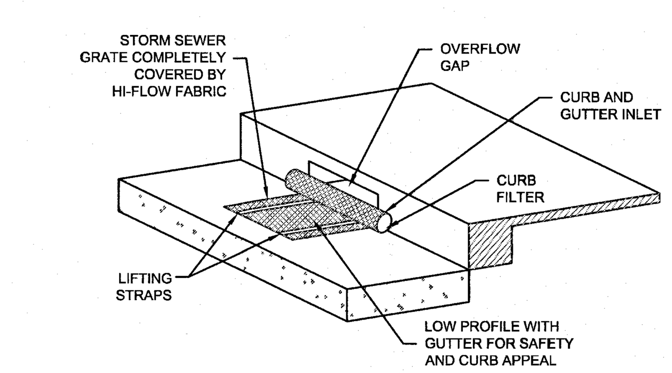
SEDIMENT BASIN TEMPORARY STANDPIPE DETAIL
NTS

TO BE INSTALLED AND REMOVED BY CONTRACTOR WHEN DIRECTED BY CONSTRUCTION MANAGER. AREA THEN TO BE RETURNED TO ITS PERMANENT INTENDED DESIGN CONDITION.



NOTES:
1. ACTUAL LAYOUT DETERMINED IN THE FIELD.
2. THE CONCRETE WASHOUT SIGN SHALL BE INSTALLED WITHIN 30' OF THE TEMPORARY CONCRETE WASHOUT FACILITY.

CONCRETE WASHOUT DETAIL
NTS



SPECIFICATIONS

MECHANICAL PROPERTIES	TEST METHOD	UNITS	MARV
GRAB TENSILE STRENGTH	ASTM D 4632	KN (LBS)	1.62 (365) X 0.89 (200)
GRAB TENSILE ELONGATION	ASTM D 4632	%	24 X 10
PUNCTURE STRENGTH	ASTM D 4833	KN (LBS)	0.40 (90)
MULLEN BURST STRENGTH	ASTM D 3786	KPA (PSI)	3097 (450)
TRAPEZOID TEAR STRENGTH	ASTM D 4533	KN (LBS)	0.51 (115) X 0.33 (75)
UV RESISTENCE	ASTM D 4355	%	90
APPARENT OPENING SIZE	ASTM D 4751	MM (US STD SIEVE)	0.425 (40)
FLOW RATE	ASTM D 4491	1/MIN/M^2(GAL/MIN/FT^2)	5907 (145)
PERMITTIVITY	ASTM D 4491	SEC^{-1}	2.1

INSTALLATION: STAND GRATE ON END. SLIDE THE DANDY CURB BAG ON WITH DAM ON TOP OF THE GRATE. PULL EXCESS DOWN. LAY UNIT ON ITS SIDE. CAREFULLY TUCK FLAP IN. PRESS VELCRO STRIPS TOGETHER. INSTALL THE UNIT MAKING SURE FRONT EDGE OF GRATE IS INSERTED IN FRAME FIRST THEN LOWER BACK INTO PLACE. PRESS VELCRO DOTS TOGETHER THAT ARE LOCATED UNDER STRAPS TO HOLD STRAPS TO SURFACE OF UNIT.

MAINTENANCE: WITH A STIFF BRISTLE BROOM OR SQUARE POINT SHOVEL REMOVE SILT & OTHER DEBRIS OFF SURFACE AFTER EACH EVENT. REMOVE FINE MATERIAL FROM INSIDE ENVELOPE AS NEEDED.

DANDY CURB DETAIL
NTS

STATE OF OHIO
MICHAEL J. COUVREUR
E-70851
REGISTERED
PROFESSIONAL ENGINEER

THE KLEINGERS GROUP
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SHP LEADING DESIGN
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236 High Street, Hamilton, Ohio 45011 — 513-863-5441
250 Civic Center Drive, Columbus, Ohio 43215 — Suite 200, 614-223-2124
1675 Broadway, Denver, Colorado 80202 — Suite 1300, 303-209-7866

City Administrator ____________
Service Director ____________
Review for the City of Grove City ____________
Jackson Township Fire Department ____________

DEVELOPMENT PLAN
CITY PROJECT NO. ____________

HIGHLAND PARK ELEMENTARY SCHOOL
2600 Cameron Street., Grove City, Ohio 43123

SOUTH-WESTERN CITY SCHOOL DISTRICT
3805 Marlane Drive, Grove City, OH 43123

EROSION CONTROL DETAILS

DATE 07/23/14

C103

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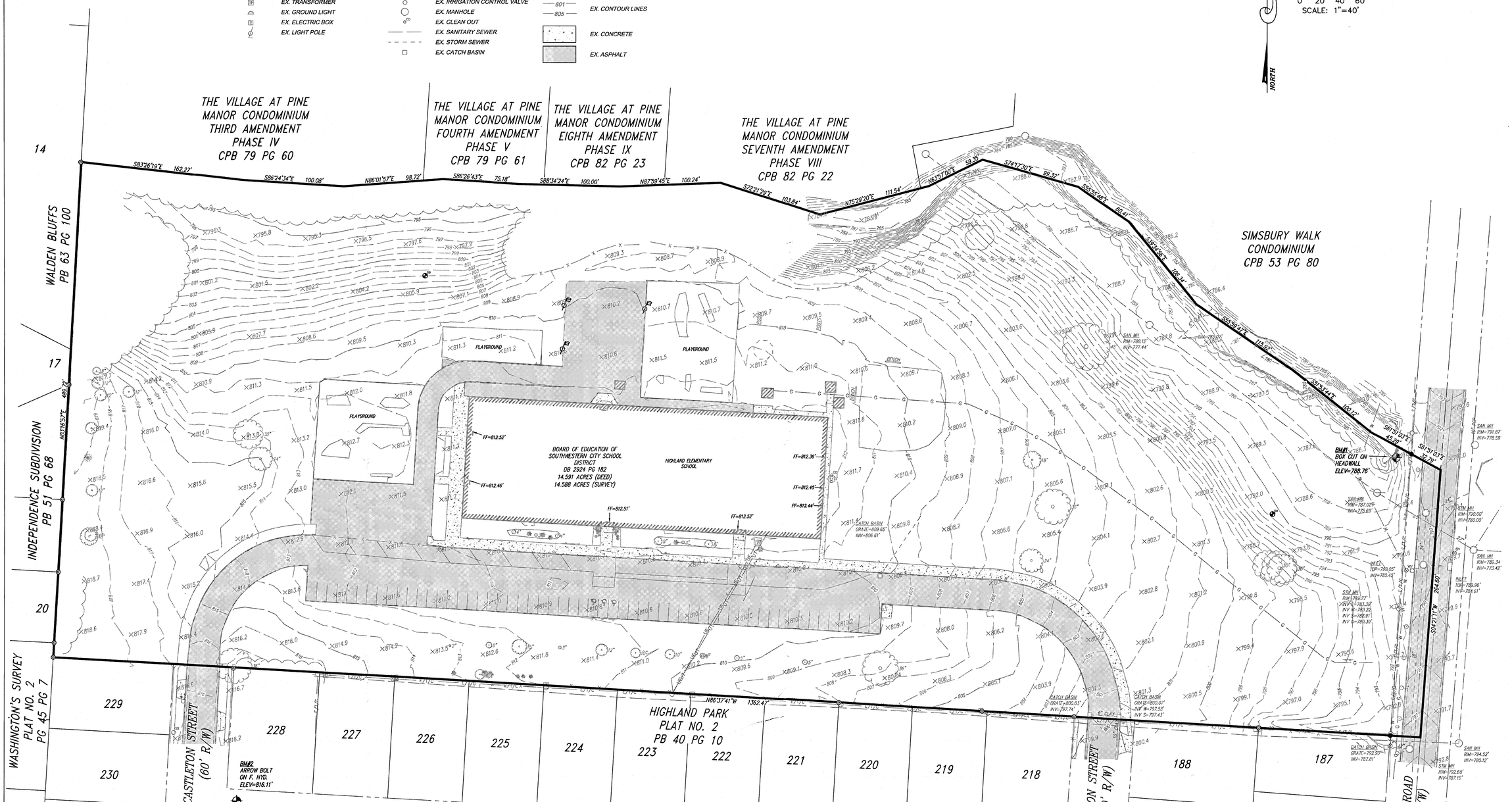
LEGEND

□	CONCRETE MONUMENT FOUND	—UT—	EX. UNDERGROUND TELEPHONE	▭	EX. INLET
●	5/8" CAPPED IRON PIN SET	—T—	EX. OVERHEAD TELEPHONE	YD	EX. YARD DRAIN
○	5/8" IRON PIN FOUND	Ⓣ	EX. TELEPHONE MANHOLE	DS	EX. DOWN SPOUT
◎	1" IRON PIPE FOUND	TP	EX. TELEPHONE PEDESTAL	TR	EX. TRAFFIC CONTROL CABINET
▲	NAIL SET	—G—	EX. GAS MAIN	TSP	EX. TRAFFIC SIGNAL POLE
	BENCHMARK	GV	EX. GAS VALVE		EX. SIGN
	EX. UTILITY POLE	—UCATV—	EX. UNDERGROUND CABLE TV	GP	EX. GUARD POST (PIPE BOLLARD)
	EX. GUY WIRE	—W—	EX. WATER MAIN	FP	EX. FLAG POLE
—UE—	EX. UNDERGROUND ELECTRIC		EX. FIRE HYDRANT	—X—	EX. FENCE
—E—	EX. OVERHEAD ELECTRIC	WV	EX. WATER VALVE	SB	EX. SOIL BORING
	EX. HVAC UNIT	WM	EX. WATER METER		EX. HARDWOOD TREE
TR	EX. TRANSFORMER	CO	EX. IRRIGATION CONTROL VALVE	—801—	EX. CONTOUR LINES
	EX. GROUND LIGHT		EX. MANHOLE	—805—	
	EX. ELECTRIC BOX	CO	EX. CLEAN OUT		EX. CONCRETE
	EX. LIGHT POLE		EX. SANITARY SEWER		EX. ASPHALT
			EX. STORM SEWER		
			EX. CATCH BASIN		



NOTES:

1.) OCCUPATION IN GENERAL FITS SURVEY.

2.) SOURCE DOCUMENTS AS NOTED.

3.) ALL MONUMENTATION IS IN GOOD CONDITION UNLESS OTHERWISE NOTED.

4.) BEARINGS ARE BASED ON THE STATE PLANE COORDINATE SYSTEM, (OSPC), OHIO SOUTH ZONE, BASED ON A GPS SURVEY UTILIZING CORS STATION "COLB" AND MONUMENT "SW 8". THE PROJECT COORDINATES ARE BASED ON OSPC AND HAVE BEEN SCALED TO GROUND BY USING A PROJECT ADJUSTMENT FACTOR OF 1.0000515174 APPLIED AT BASE POINT N 691,800.00 E 1,808,200.00 . GRID AND GROUND COORDINATES ARE IDENTICAL AT THE BASE POINT.

5.) VERTICAL DATUM IS NAVD88.

6.) UTILITIES SHOWN ARE BASED ON PHYSICAL MARKINGS, PLAN INFORMATION PROVIDED BY UTILITY OWNERS, AND LOCATIONS OF ABOVE-GROUND APPURTENANCES; HOWEVER, LACKING EXCAVATION, THE EXACT LOCATION OF UNDERGOUND FEATURES CANNOT BE ACCURATELY, COMPLETELY AND RELIABLY DEPICTED. THE OHIO UTILITY PROTECTION SERVICE (OUPS) WAS CONTACTED ON OCTOBER 5, 2012; OUPS TICKET #A227901431, & A227901433.

8.) THIS SURVEY IS BASED ON AN ACTUAL FIELD SURVEY PERFORMED BY KLEINGERS AND ASSOCIATES IN OCTOBER, 2012.

I HEREBY CERTIFY THAT THIS PLAT IS BASED UPON A FIELD SURVEY MADE UNDER MY DIRECTION.

Michael L. Keller 7/22/14

MICHAEL L. KELLER — DATE
OHIO PROFESSIONAL SURVEYOR NO. 7978

STATE OF OHIO — MICHAEL L. KELLER 7978 — REGISTERED PROFESSIONAL SURVEYOR

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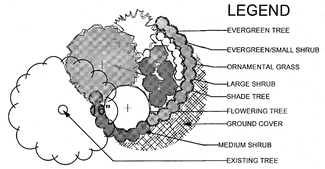
2600 Cameron Street., Grove City, Ohio 43123

SOUTH-WESTERN CITY SCHOOL DISTRICT
3805 Marlane Drive, Grove City, OH 43123

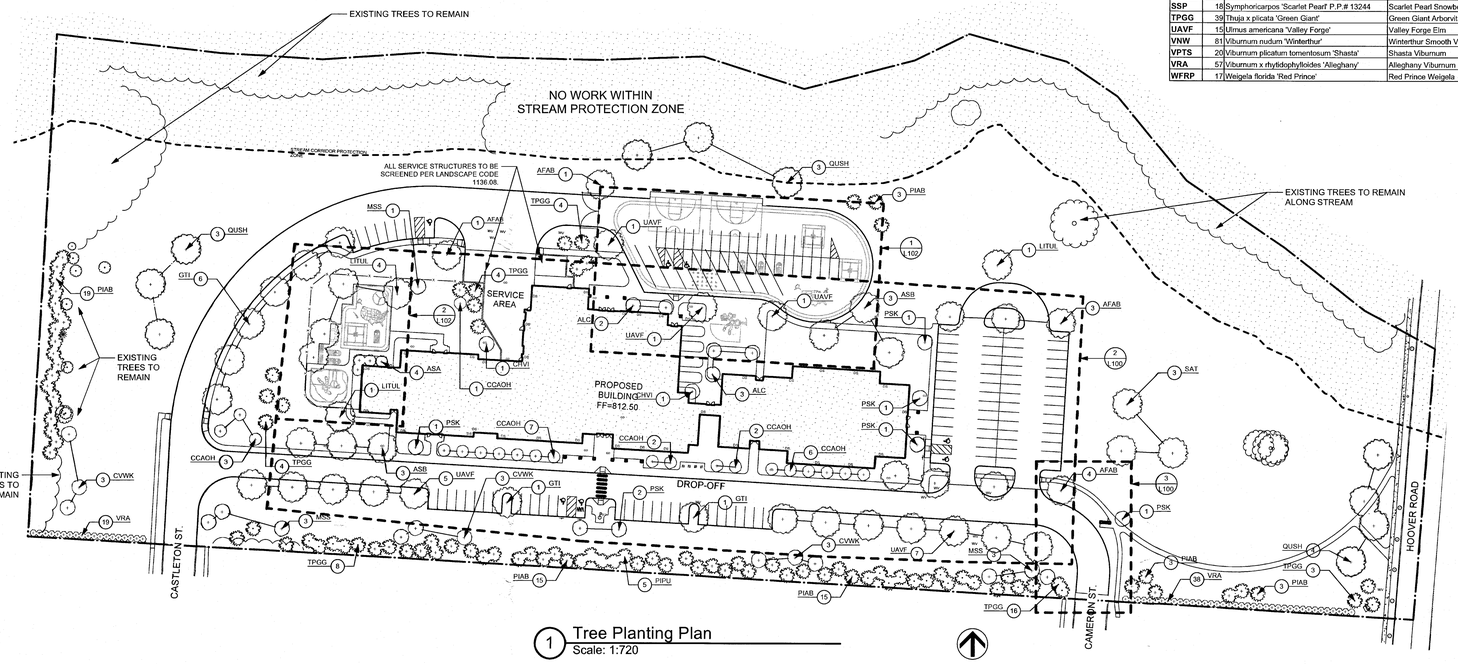
SITE SURVEY

DATE 07/23/14

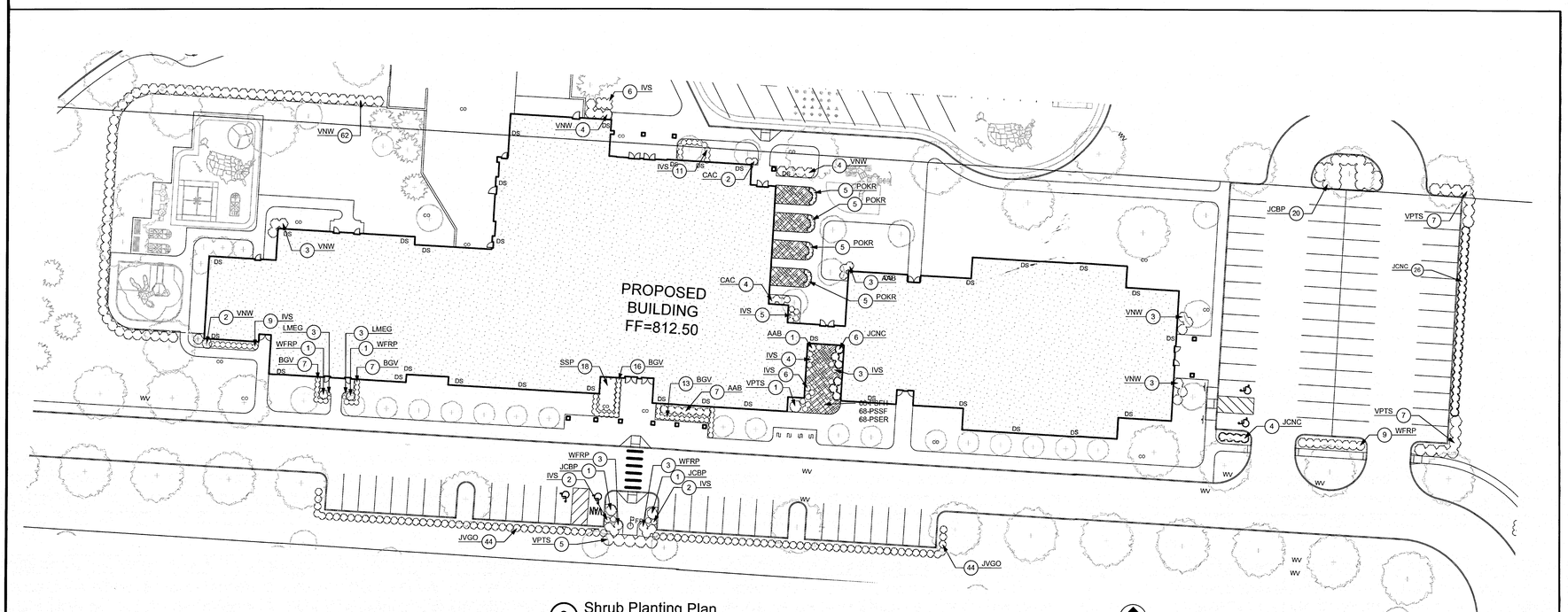
C104



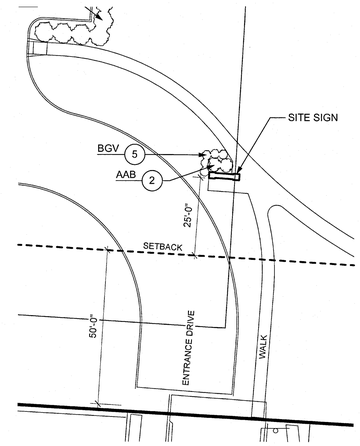
Plant List					
ID	Qty	Latin Name	Common Name	Scheduled Size	Remarks
AAB	13	Aronia arbutifolia 'Brilliantissima'	Brilliant Red Chokeberry	7 Gal	Fully rooted containers, matching forms
AFAB	9	Acer x freemanii 'Jeffsred' P.P.# 4864	Autumn Blaze(R) Maple	2.5" Cal	Limbed to 6'
ALC	5	Amelanchier laevis 'Cumulus'	Cumulus Serviceberry	2" Cal	Select specimentree-form, matching forms.
ASA	4	Acer saccharum 'Astis'	Steeple(R) Sugar Maple	2.5" Cal	Limbed to 6'
ASB	6	Acer saccharum 'Bonfire' P.P.# 3817	Bonfire Rock Maple	3" Cal	Limbed to 6'
BGV	54	Buxus 'Green Velvet' (COPF)	Green Velvet Boxwood	18" Spr	B&B
CAC	6	Cletha alnifolia 'Caleb' P.P.A.F., CBRAF	Vanilla Spice® Summersweet	3 Gal	Matching form, fully rooted containers
CCAOH	21	Cercis canadensis 'Ace Of Hearts' P.P.A.F.	Ace of Hearts Redbud	2" Cal	Select specimen, matching forms.
CHVI	2	Chionanthus virginicus	White Fringe Tree	5'-6'HT	Select specimen, B&B
CVWK	9	Crataegus viridis 'Winter King'	Winter King Hawthorn	2" Cal	Select specimen, matching forms.
GTI	8	Gleditsia triacanthos var. inermis 'Imperial'	Imperial Honeylocust	2.5" Cal	Limbed to 6'
IVS	48	Itea virginica 'Sprich' P.P. #10,988	Little Henry® Dwarf Virginia Sweetspire	3 Gal	Fully rooted container, matching form
JCBP	22	Juniperus conferta 'Blue Pacific'	Blue Pacific Shore Juniper	3 Gal	Fully rooted container, matching form
JCNC	36	Juniperus chinensis 'Nick's Compact'	Nick's Compact Juniper	3 Gal	Matching form, fully rooted pots
JVGO	88	Juniperus virginiana 'Grey Owl'	Grey Owl Juniper	3 Gal	Matching form, fully rooted container
LITUL	6	Liriodendron tulipifera	Tulip Tree	2.5" Cal	Limbed to 6'
LMEG	6	Liriope muscari 'Evergreen Giant'	Evergreen Giant Lilyturf	1 Gal	Fully rooted pots
MSS	7	Malus x 'Spring Snow' P.P.# 2667	Spring Snow Crabapple	2" Cal	Select specimen, matching forms.
PIAB	58	Picea abies	Norway Spruce	6' Ht	Selected for full matching form.
PIPU	5	Picea pungens	Colorado Spruce	6' Ht	Selected for full matching form and consistent color.
POKR	20	Pennisetum orientale 'Karley Rose' P.P.A.F.	Karley Rose Fountain Grass	1 Gall	Fully rooted pots
PSER	68	Phlox subulata 'Emerald Red'	Emerald Red Creeping Phlox	6" Pot	Fully rooted pots
PSFH	68	Phlox subulata 'Fort Hills'	Fort Hills Creeping Phlox	6" Pot	Fully rooted pots
PSK	7	Prunus serrulata 'Kwanzan'	Kwanzan Flowering Cherry	2" Cal	Select specimentree-form, matching forms.
PSSF	68	Phlox subulata 'Snowflake'	Snowflake Creeping Phlox	6" Pot	Fully rooted pots
QUSH	10	Quercus shumardii	Shumard Oak	3" Cal	Limbed up to 6' Ht.
SAT	3	Salix alba 'Tristis'	Golden Niobe Willow	2.5" Cal	Limbed to 6' Ht
SSP	18	Symphoricarpos 'Scarlet Pearl' P.P.# 13244	Scarlet Pearl Snowberry	5 Gal	Fully rooted container, matching form
TPGG	39	Thuja x plicata 'Green Giant'	Green Giant Arborvitae	6' Ht	B&B, Selected for full matching form.
UAVF	15	Ulmus americana 'Valley Forge'	Valley Forge Elm	2.5" Cal	Limbed to 6' Ht
VNW	81	Viburnum nudum 'Winterthur'	Winterthur Smooth Viburnum	4'HT	B&B
VPTS	20	Viburnum plicatum tomentosum 'Shasta'	Shasta Viburnum	4'HT	B&B
VRA	57	Viburnum x rhytidophylloides 'Alleghany'	Alleghany Viburnum	4'HT	B&B
WFRP	17	Weigela florida 'Red Prince'	Red Prince Weigela	3 Gal	Matching form, fully rooted pots



1 Tree Planting Plan
Scale: 1:720



2 Shrub Planting Plan
Scale: 1" = 30 ft



3 Site Sign Plan
Scale: 1" = 20 ft

PLANTING NOTES

1. ALL PLANTS SHALL BE BALLED AND BURLAPPED UNLESS OTHERWISE STATED IN THE PLANT LIST. SYNTHETIC OR TREATED BURLAP SHALL NOT BE USED IN BALLING AND BURLAPPING ANY PLANTS ON THIS PROJECT.

2. ALL PLANT MATERIALS SHALL MEET OR EXCEED THE SIZES GIVEN IN THE PLANT LISTS AND SHALL HAVE A HABIT OF GROWTH THAT IS NORMAL FOR THE SPECIES AND A WELL-BRANCHED STRUCTURE. THEY SHALL BE SOUND, HEALTHY AND VIGOROUS, WITH BALANCED ROOT AND TOP GROWTH. PLANTS SHALL BE FREE OF DISEASE, INSECTS, EGGS, LARVAE AND DEFECTS SUCH AS KNOTS, SUNSCALD, INJURIES, ABRASIONS, OR DISFIGUREMENT. ALL MEASUREMENTS SUCH AS CALIPER, HEIGHT, SPREAD AND QUALITY DESIGNATIONS MUST BE IN ACCORDANCE WITH THE LATEST EDITION OF AMERICAN STANDARD FOR NURSERY STOCK ANSI Z60.1. PLANT MATERIALS FOR THIS PROJECT MUST COME FROM NURSERIES LOCATED IN ZONES 5A TO 6A AS SET FORTH IN THE MOST RECENT USDA PLANT HARDINESS ZONE CHART AND WITH A SIMILAR SOIL TYPE OF CLAY LOAM.

3. ALL PLANTS AND PLANTINGS ARE SUBJECT TO THE APPROVAL OF THE LANDSCAPE ARCHITECT AND SHALL BE INSTALLED ONLY AS SHOWN ON THE DRAWINGS OR AS DIRECTED BY THE LANDSCAPE ARCHITECT.

4. SUBSTITUTIONS WILL NOT BE PERMITTED AFTER THE CONTRACT IS AWARDED. SUBMIT PROOF IN WRITING THAT A PLANT IS NOT OBTAINABLE AND PROPOSED SUBSTITUTION LIST FOR APPROVAL BY THE LANDSCAPE ARCHITECT FOR USE OF THE NEAREST EQUIVALENT OBTAINABLE SIZE OR VARIETY OF PLANT HAVING THE SAME ESSENTIAL CHARACTERISTICS.

5. SHOULD THE LANDSCAPE CONTRACTOR ENCOUNTER UNSATISFACTORY SURFACE OR SUBSURFACE DRAINAGE CONDITIONS, TOPSOIL DEPTH, HARD PAN, UTILITY LINES, CONSTRUCTION DEBRIS OR OTHER CONDITIONS THAT WILL JEOPARDIZE THE HEALTH AND VIGOR OF THE PLANTS, HE MUST ADVISE THE LANDSCAPE ARCHITECT OF THE CONDITIONS PRIOR TO INSTALLING THE PLANTS AND NOT INSTALL PLANTS UNTIL RECEIVING WRITTEN AUTHORIZATION FROM THE LANDSCAPE ARCHITECT. OTHERWISE THE LANDSCAPE CONTRACTOR WARRANTS THAT THE PLANTING AREAS ARE SUITABLE FOR PROPER GROWTH AND DEVELOPMENT OF THE PLANTS TO BE INSTALLED.

6. PERFORM PERCOLATION TESTS FOR BED AREAS AND TREES IN LAWN AREAS, PRIOR TO PLANTING. PERCOLATION TEST SHALL BE PERFORMED BY DIGGING A HOLE TO THE DEPTH OF THE ROOTBALL; FILL THE HOLE WITH WATER. THE WATER SHOULD DRAIN THROUGH THE HOLE WITHIN 24 HOURS. PERFORM THE PERCOLATION TEST A THREE (3) TIMES MIN. IN EACH BED AND AT 15 TREE LOCATIONS. TREE LOCATIONS SHALL BE RANDOM THROUGHOUT THE SITE. SHOULD THE TESTS REPEATEDLY FAIL, CONTACT LANDCAPE ARCHITECT FOR DIRECTION. SHOULD THE LANDSCAPE CONTRACTOR ELECT NOT TO REPORT POOR DRAINAGE CONDITIONS, IT REMAINS THEIR RESPONSIBILITY TO WARRANTY AND REPLACE ALL RESULTING DEAD PLANTS.

7. PLANTING MIX: ALL BED AREAS AS SHOWN ON PLANS TO BE DUG OUT TO 12" DEEP AND BACK FILLED WITH PLANTING MIX OF 8" TOPSOIL AND 4" PINEBARK FINES. HEDGE BEDS TO BE DEVELOPED 3' WIDE FOLLOWING CENTERLINE OF HEDGE. BACKFILL ISOLATED PARKING LOT ISLAND PLANTING AREAS WITH PLANTING MIX TO A DEPTH OF 12". REMOVE ALL UNDESIRABLE MATERIAL LARGER THAN TWO INCHES IN ANY DIMENSION AND DISPOSE OF OFF THE SITE DURING THIS OPERATION. REMOVE ANY ROCK OR UNDERGROUND OBSTRUCTION TO THE DEPTH NECCESSARY FOR PLANTING AS SPECIFIED, UNLESS OTHER PLANTING LOCATIONS ARE ACCEPTED BY THE LANDSCAPE ARCHITECT.

8. BED AREAS, INCLUDING TREE CIRCLES ARE TO BE MULCHED WITH 2" OF SHREDDED HARDWOOD BARK MULCH. SUBMIT SAMPLE FOR REVIEW BY LANDSCAPE ARCHITECT. PROVIDE A SMOOTH SHOVEL CUT EDGE TO ALL BED LINES AS SHOWN ON THE DRAWINGS. APPLY PRE-EMERGENT HERBICIDE IN ACCORDANCE WITH MANUFACTURERS SPECIFICATIONS AND RATES TO ALL BED AREAS AND TREE CIRCLES PRIOR TO PLACING MULCH.

10. FINISH GRADING: THE FINISH SURFACE SHALL BE SMOOTH AND FREE OF BUMPS, DEPRESSIONS, OTHER IRREGULARITIES OR FOREIGN MATERIALS.

11. PLANTING PITS FOR TREES AND SHRUBS SHALL BE DUG THREE TIMES IN DIAMETER THE SPREAD OF THE ROOTS, (OR A MIN. 3' RADIUS/6' DIA PLANTING PIT) AND HAVE A DEPTH EQUAL TO THE HEIGHT OF THE ROOTBALL OR CONTAINER, WITH SLOPED SIDES AND FLAT BOTTOMS. ANY HEAVY CLAY OR OTHER SOIL UNSUITABLE FOR PLANTING ENCOUNTERED IN THE HOLES SHALL BE REMOVED FROM THE SITE, UNLESS DISPOSITION ON THE PROJECT SITE IS DIRECTED BY THE GENERAL CONTRACTOR OR CONSTRUCTION MANAGER. NO MORE THAN 1" OF BACKFILL SHALL BE PLACED ON TOP OF THE ROOTBALL.

12. ALL CORDS AND BINDINGS SHALL BE CUT FROM PLANTS PRIOR TO BACKFILLING. THE TOP 1/2 OF WIRE BASKET AND TOP 1/3 OF BURLAP SHALL BE REMOVED FROM THE ROOTBALL OF TREES AND SHRUBS, PRIOR TO BACKFILLING.

13. ALL PLANTS, TREES, SHRUBS AND VINES SHALL BE GUARANTEED BY THE CONTRACTOR FOR A PERIOD OF ONE YEAR AFTER FORMAL ACCEPTANCE OF THE PLANTING BY THE OWNER. FOR FINAL ACCEPTANCE, AN INSPECTION WILL BE MADE BY THE OWNER AND LANDSCAPE ARCHITECT UPON WRITTEN OR VERBAL NOTICE REQUESTING SUCH INSPECTION, SUBMITTED BY THE CONTRACTOR AT LEAST TEN (10) DAYS PRIOR TO THE ANTICIPATED DATE. FINAL ACCEPTANCE WILL BE GIVEN WHEN THE CONTRACTOR HAS CORRECTED ALL PUNCH LIST ITEMS FOUND IN THE FIANL ACCEPTANCE INSPECTION. MATERIAL SHALL BE ALIVE AND IN SATISFACTORY GROWTH AS DETERMINED BY THE LANDSCAPE ARCHITECT AT THE BEGINNING AND END OF THE GUARANTEE PERIOD. THE CONTRACTOR SHALL CHECK THE PLANTINGS REGULARLY DURING THE GUARANTEE PERIOD. SHOULD THE CONTRACTOR FIND THE PLANT MATERIAL IS NOT RECEIVING THE PROPER MAINTENANCE AT ANY TIME PRIOR TO THE END OF THE GUARANTEE PERIOD, HE SHOULD ADVISE THE LANDSCAPE ARCHITECT AND THE OWNER IMMEDIATELY IN WRITING SO CORRECTIVE MEASURES MAY BE INITIATED. REPLACEMENT: AT THE END OF THE GUARANTEE PERIOD, AN INSPECTION WILL BE MADE BY THE OWNER AND LANDSCAPE ARCHITECT UPON WRITTEN OR VERBAL NOTICE REQUESTING SUCH INSPECTION, SUBMITTED BY THE CONTRACTOR AT LEAST TEN (10) DAYS PRIOR TO THE ANTICIPATED DATE. ANY PLANT REQUIRED UNDER THIS CONTRACT THAT IS DEAD OR NOT SATISFACTORY IN GROWTH AS DETERMINED BY THE LANDSCAPE ARCHITECT SHALL BE REMOVED FROM THE SITE. THESE AND ANY PLANTS MISSING DUE TO THE CONTRACTOR'S NEGLIGENCE, SHALL BE REPLACED AS SOON AS CONDITIONS PERMIT DURING THE NORMAL PLANTING SEASON. IF REPLACEMENTS ARE PLANTED WHILE THEY ARE DORMANT, THEY MUST FULLY LEAFOUT THE FOLLOWING SPRING TO MEET THE REQUIREMENTS OF THIS PROJECT.

14. THE CONTRACTOR SHALL REMOVE FROM THE PROJECT SITE ALL EXCESS MATERIAL, DEBRIS, EQUIPMENT AND RELATED ITEMS PERTINENT TO THE WORK UNDER THIS CONTRACT AS REQUIRED IN PROJECT DOCUMENTS.

15. REFER TO SPECIFICATION 329200 FOR SEED MIX, BROADCAST RATES. BEFORE BROADCASTING SEED, ALL SOFT SPOTS AND INEQUALITIES IN GRADE SHALL BE CORRECTED AND FERTILIZER SHALL BE SPREAD AND RAKED IN AND WATERED THOROUGHLY. SEED MAY BE APPLIED BY 'HYDROSEEDING' METHODS. A BIODEGRADABLE ERSOSION CONTROL MAT SHALL BE PLACED ALONG BOTTOM OF ALL SWALE AREAS AND SLOPES OF 3:1 AND GREATER, IN PLACE OF STRAW MULCH.

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SOUTH-WESTERN CITY SCHOOL DISTRICT
3805 Marlane Drive, Grove City, OH 43123

ISSUANCES

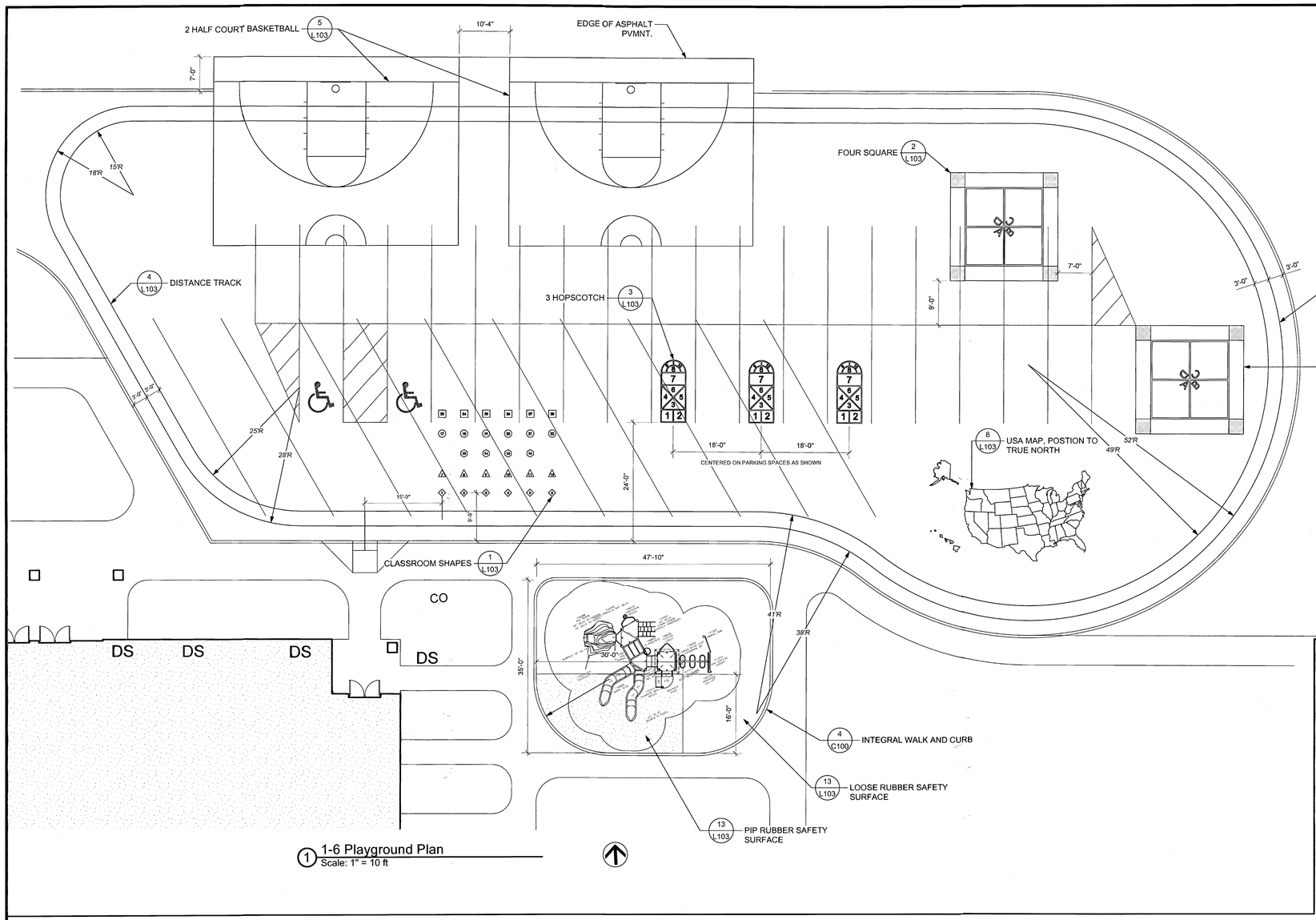
05-13-14	DESIGN DEVELOPMENT
07-23-14	PLANNING & DEVELOPMENT REISSUE

Planting Plans

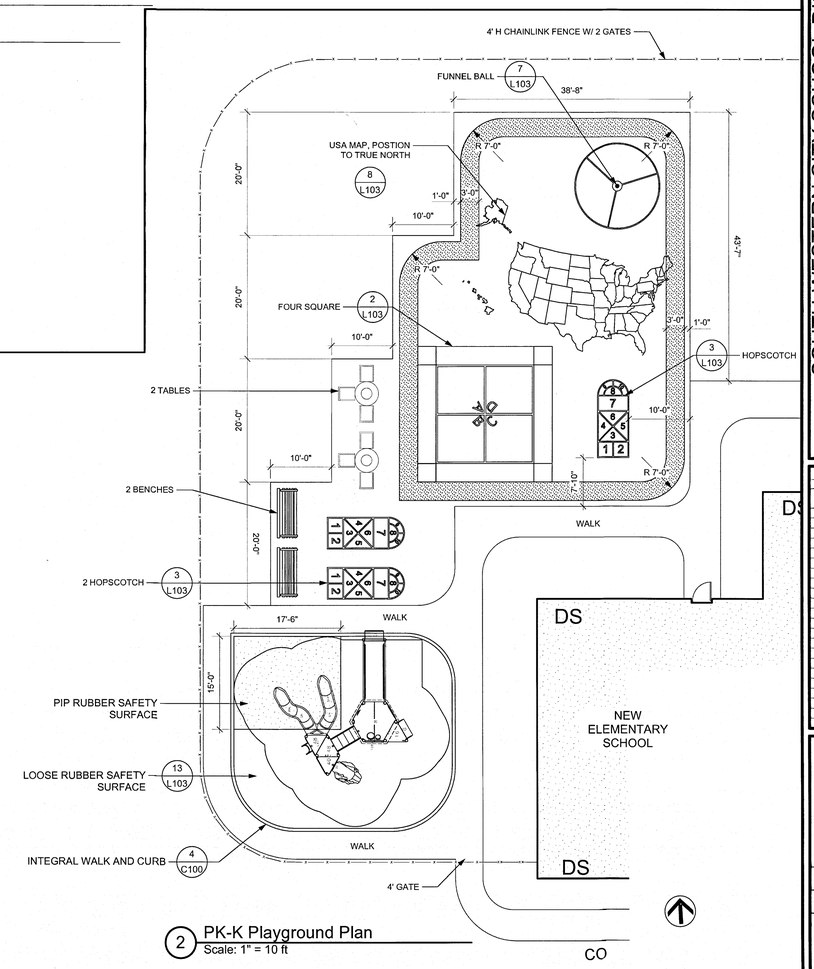
DATE 07-23-2014

COMM NO. 2012014.09

L100



1 1-6 Playground Plan
Scale: 1" = 10 ft



2 PK-K Playground Plan
Scale: 1" = 10 ft

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ISSUANCES

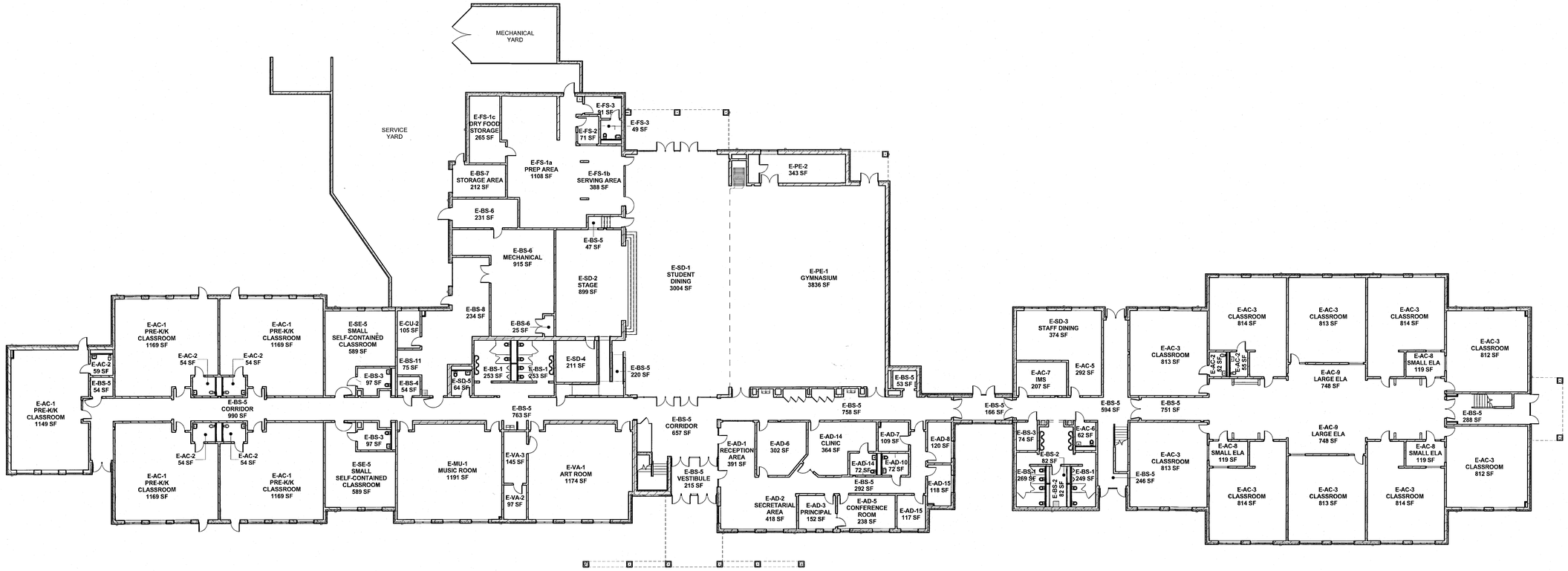
06-13-14	DESIGN DEVELOPMENT
07-23-14	PLANNING & DEVELOPMENT REISSUE

Enlarged Playground Plans

DATE 07-23-2014

COMM NO. 2012014.09

L102

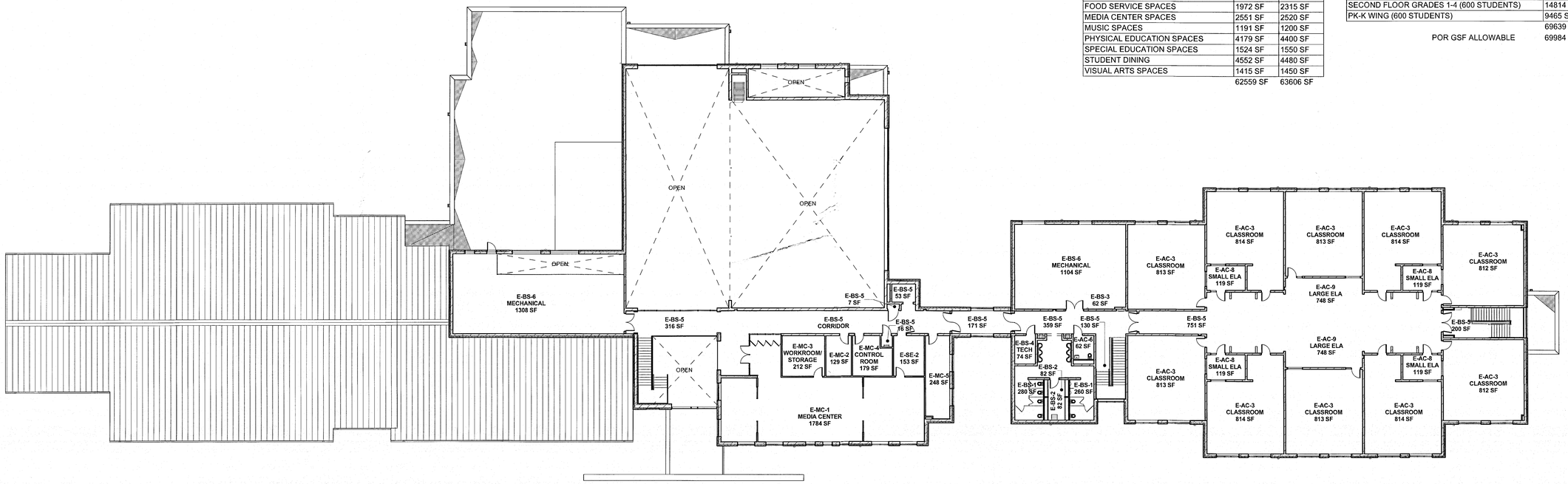


N

1 X101 FIRST FLOOR OSFC PLAN
1/16" = 1'-0"

OSFC DEPARTMENT SCHEDULE (NET AREA)		
DEPARTMENT	AREA	POR SF
ACADEMIC CORE	26917 SF	27140 SF
ADMINISTRATIVE SPACES	2474 SF	2480 SF
BUILDING SERVICES	15304 SF	15571 SF
CUSTODIAL SPACES	478 SF	500 SF
FOOD SERVICE SPACES	1972 SF	2315 SF
MEDIA CENTER SPACES	2551 SF	2520 SF
MUSIC SPACES	1191 SF	1200 SF
PHYSICAL EDUCATION SPACES	4179 SF	4400 SF
SPECIAL EDUCATION SPACES	1524 SF	1550 SF
STUDENT DINING	4552 SF	4480 SF
VISUAL ARTS SPACES	1415 SF	1450 SF
	62559 SF	63606 SF

OSFC GROSS BUILDING AREA	
BUILDING AREA	AREA (GROSS)
FIRST FLOOR CORE (600 STUDENTS)	23928 SF
SECOND FLOOR CORE (600 STUDENTS)	6425 SF
FIRST FLOOR GRADES 1-4 (600 STUDENTS)	15007 SF
SECOND FLOOR GRADES 1-4 (600 STUDENTS)	14814 SF
PK-K WING (600 STUDENTS)	9465 SF
	69639 SF
POR GSF ALLOWABLE	69984 SF



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2 X101 SECOND FLOOR OSFC PLAN
1/16" = 1'-0"

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ISSUANCES	
04-11-14	SCHEMATIC DESIGN
06-13-14	DESIGN DEVELOPMENT
06-13-14	ZONING SUBMISSION

OSFC DATA

DATE 06-13-14

COMM NO. 2012014.09

X101

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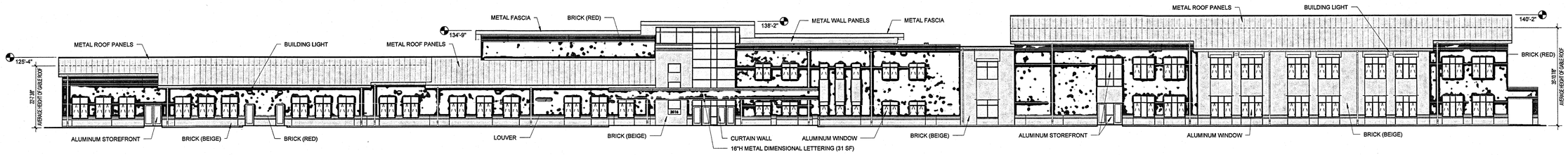
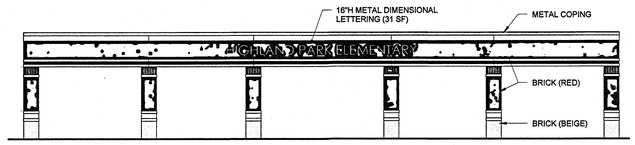
"0.1" REFRENCE LINE"



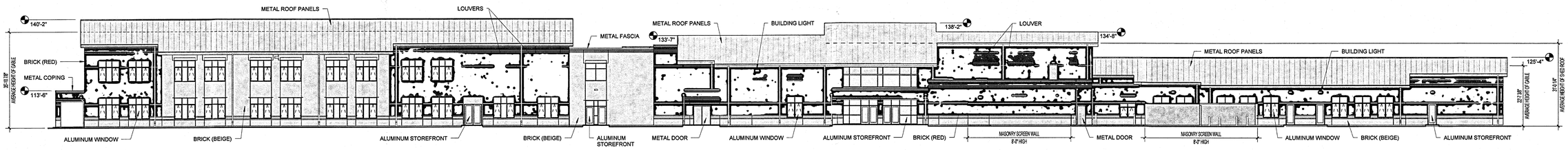
OVERALL SOUTH ELEVATION

1/16" = 1'-0"



ENTRY CANOPY ELEVATION

1/8" = 1'-0"



OVERALL NORTH ELEVATION

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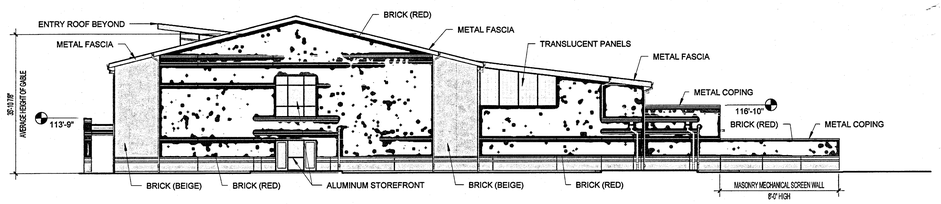
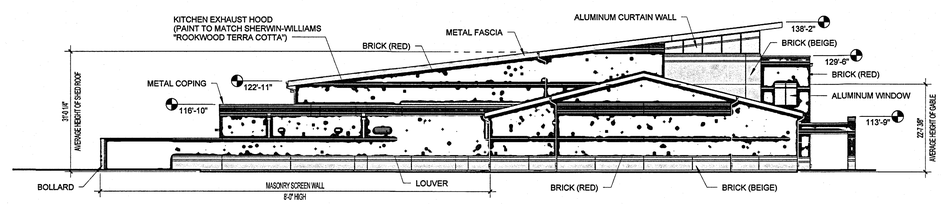


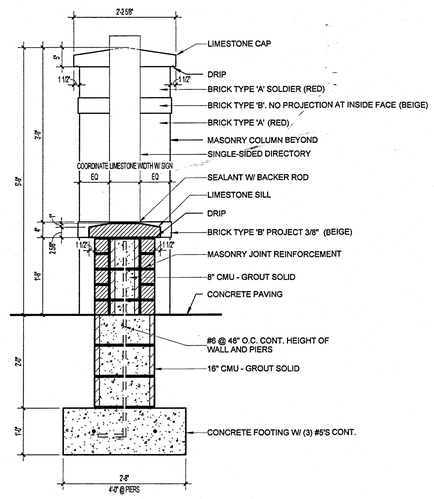
OVERALL EAST ELEVATION

1/16" = 1'-0"



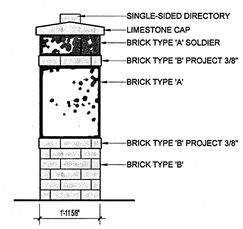
OVERALL WEST ELEVATION

1/16" = 1'-0"



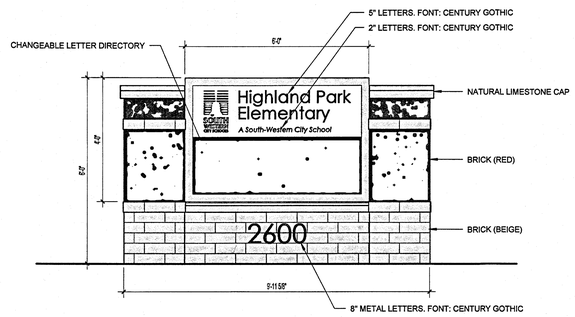
SITE SIGN SECTION

3/4" = 1'-0"



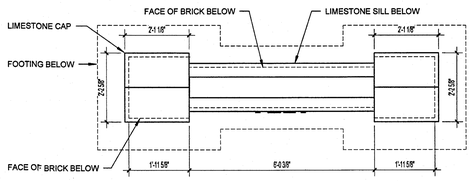
SITE SIGN ELEVATION

1/2" = 1'-0"



SINGLE-SIDED SITE SIGN ELEVATION

1/2" = 1'-0"



SITE SIGN PLAN

1/2" = 1'-0"

0'-1" REFERENCE LINE

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ISSUANCES	
06-13-14	ZONING SUBMISSION
07-23-14	ZONING RESUBMISSION

EXTERIOR ELEVATIONS

DATE 07-23-14

COMM NO. 2012014.09

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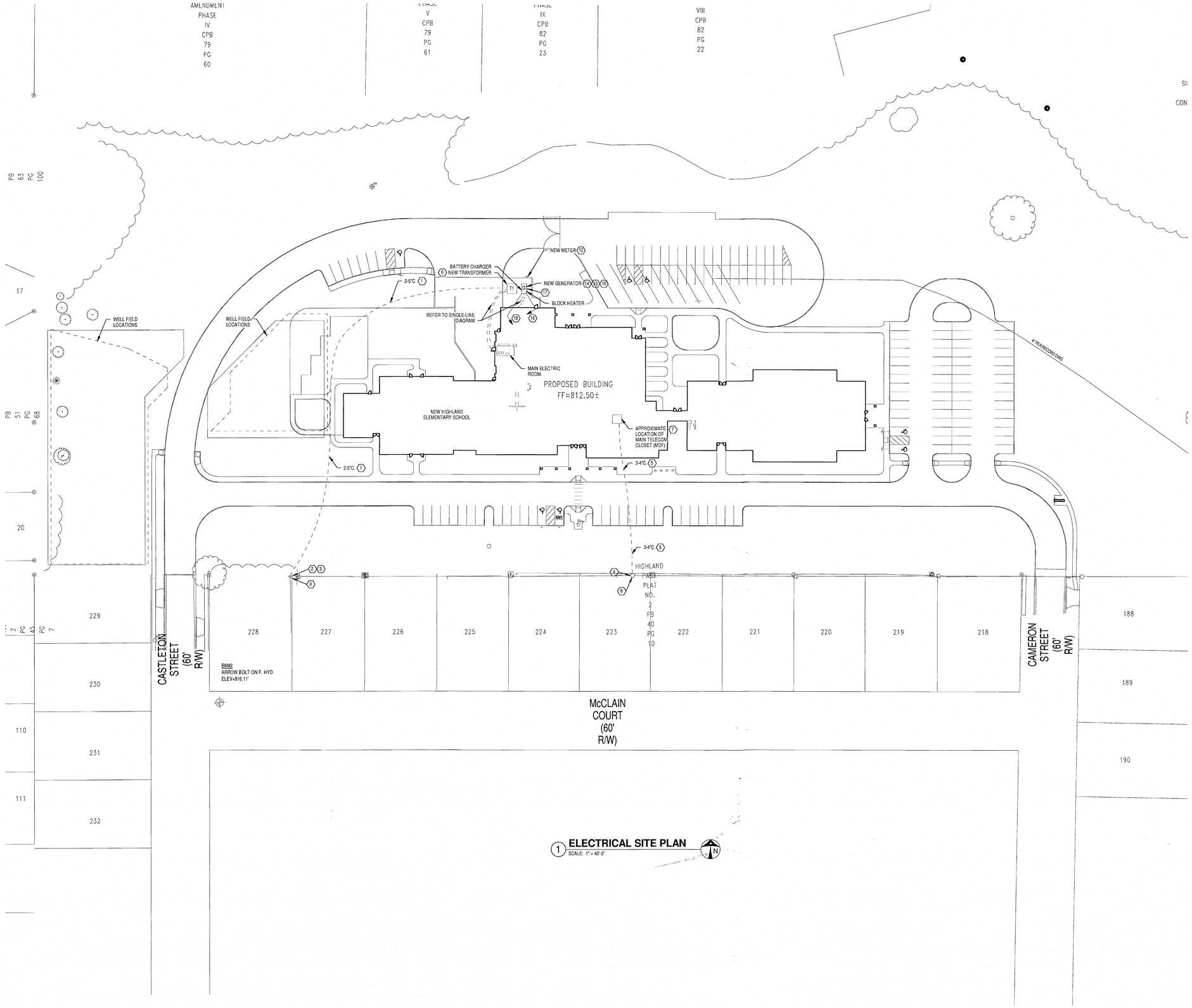


1 **ELECTRICAL SITE PLAN**
SCALE: 1" = 40'-0"

NOTES

1. NEW UNDERGROUND PRIMARY ELECTRIC DUCTBANK CONSISTING OF 2-6" DUCTS PER DETAILS, ON SHEET E003. DUCTS SHALL BE ENCASED IN 3000LB CONCRETE. DUCTBANK PROVIDED BY E.C.; ALL PRIMARY CONDUCTORS PROVIDED BY POWER CO. COORDINATE EXACT LOCATION/ROUTE OF DUCTBANK AND SERVICE ENTRANCE REQUIREMENTS WITH POWER CO. PRIOR TO THIS WORK.
2. EXISTING POWER CO. RISER POLE. POWER CO. TO PROVIDE NEW FUSED CUT-OUTS ON POLE AND MAKE CONNECTION TO OVERHEAD PRIMARY. POWER CO. TO EXTEND NEW UNDERGROUND PRIMARY FROM FUSED CUT-OUTS ON POLE TO NEW TRANSFORMER AT THE NEW ELEMENTARY SCHOOL. WORK TO BE COORDINATED WITH THE POWER CO.
3. E.C. SHALL PROVIDE PVC SCHEDULE 40 UNDERGROUND CONDUIT FROM NEW TRANSFORMER AT THE NEW ELEMENTARY SCHOOL UP BASE OF UTILITY POLE TO LOCATION OF NEW FUSED CUT-OUTS. COORDINATE REQUIREMENTS WITH POWER CO. PRIOR TO ROUGH-IN AND PROVIDE ACCORDINGLY. REFER TO SINGLE-LINE DIAGRAM AND POWER CO. DRAWINGS.
4. PROVIDE PVC SCHEDULE 40 CONDUIT UP UTILITY POLE TO 18" ABOVE GRADE WITH LONG SWEEPING BENDS FOR TELEPHONE AND CATV SERVICE DUCTBANK. COORDINATE WORK WITH UTILITY COMPANIES PRIOR TO ROUGH-IN. CAP ALL SPARE CONDUITS AT POLE.
5. NEW UNDERGROUND TELEPHONE SERVICE CONSISTING OF 2-4" DUCTS AND CABLE TV SERVICE CONSISTING OF 1-4" DUCT (3-4" DUCTS TOTAL) PER DETAILS, ON SHEET E003. DUCTS SHALL BE ENCASED IN 3000LB CONCRETE. RUN CONDUITS TO LOCATION OF MDF IN NEW ELEMENTARY AND STUB 8" ABOVE FLOOR. COORDINATE EXACT LOCATION/ROUTE OF DUCT BANK WITH UTILITY COMPANIES PRIOR TO THIS WORK. VERIFY EXACT END OF CONDUIT RUN IN MAIN TELECOM CLOSET WITH DIV. 27 CONTROLLER AND PROVIDE ACCORDINGLY.
6. APPROXIMATE LOCATION OF PAD MOUNTED TRANSFORMER; E.C. SHALL PROVIDE TRANSFORMER PAD PER DETAIL A, SHEET E003 AND PER POWER CO. STANDARD DRAWINGS. VERIFY EXACT LOCATION WITH ARCHITECT PRIOR TO ROUGH-IN. POWER CO. SHALL INSTALL TRANSFORMER AND PERFORM FINAL TERMINATIONS. POWER CO. SHALL EXTEND PRIMARY ELECTRIC FEEDER FROM UTILITY POLE TO LOCATION OF TRANSFORMER AND CONNECT TO PRIMARY SECTION. E.C. SHALL EXTEND SECONDARY ELECTRIC SERVICE FROM TRANSFORMER TO MAIN SERVICE DISCONNECT SWITCH LOCATED IN THE BUILDING. REFER TO SINGLE-LINE DIAGRAM.
7. APPROXIMATE LOCATION OF MAIN TELECOM CLOSET (MDF) LOCATED ON SECOND FLOOR. REFER ARCHITECTURAL PLANS FOR EXACT LOCATION.
8. EXISTING UTILITY POLE TO REMAIN.
9. EXISTING UNDERGROUND UTILITY TO REMAIN.
10. NEW ELECTRIC METER; E.C. SHALL VERIFY EXACT MOUNTING LOCATION WITH POWER CO. PRIOR TO ROUGH-IN AND PROVIDE ACCORDINGLY.
11. NOTE NOT USED.
12. NOTE NOT USED.
13. NOTE NOT USED.
14. PROVIDE A MINIMUM CLEARANCE OF 5' AROUND ALL SIDES OF THE GENERATOR. REFER TO DETAIL I, SHEET E005.
15. EMERGENCY FEEDER, BRANCH CIRCUITS AND CONTROLS CIRCUITS TO BE INSTALLED PER MANUFACTURERS INSTRUCTIONS. REFER TO SINGLE-LINE DIAGRAM. PROVIDE CONTROL WIRING IN SEPARATE CONDUIT (COMMON TRENCH) BETWEEN GENERATOR AND ATS AND ANNUNCIATOR PANEL PER MANUFACTURER INSTRUCTIONS.
16. PROVIDE CONCRETE PAD FOR GENERATOR PER MANUFACTURERS RECOMMENDATIONS AND PER DETAILS ON SHEET E003 AND I ON SHEET E005.
17. FIRE ALARM SYSTEM MODULES CONNECT TO SUPERVISORY OUTPUTS IN CONTROL PANEL FOR "GENERATOR RUN AND GENERATOR TROUBLE" ALARMS. RUN WIRING U/G AND TIE INTO FIRE ALARM SYSTEM AT ELEMENTARY SCHOOL. PROVIDE 2-2"C. FOR THIS WIRING.
18. RUN 20A, 208V-1PH CIRCUIT WITH 2-#10, 1-#10 GRD. IN 1"C. TO SERVE EQUIPMENT INDICATED; CIRCUIT SHALL BE RUN FROM ELECTRICAL PANEL LOCATED WITHIN THE MAIN ELECTRIC ROOM. REFER TO SHEET E203 FOR EXACT CIRCUIT NUMBERS

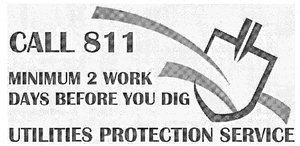
GENERAL NOTES:

A. ALL UNDERGROUND CONDUITS AND DUCTBANKS SHALL BE DIRECT BURIED PER DETAIL D, ON SHEET E003 UNLESS INDICATED OTHERWISE. ALL PRIMARY AND SECONDARY CONDUITS AND DUCTBANKS SHALL HAVE LONG SWEEPING BENDS. ALL CONDUITS BURIED UNDER DRIVEWAYS AND PARKING AREAS WHERE AUTOMOBILE TRAFFIC PASSES THROUGH SHALL BE CONCRETE ENCASED. PROVIDE ALL CONDUITS WITH PULLWIRE; ALL CONDUITS SHALL BE 1.5" UNLESS INDICATED OTHERWISE. E.C. SHALL UTILIZE COMMON TRENCH(ES) WHERE EVER FEASIBLE.

B. E.C. SHALL PROVIDE EXTERIOR MOUNTED WEATHERPROOF FIRE ALARM AUDIOVISUAL DEVICE ON THE OUTSIDE OF THE BUILDING AS DIRECTED BY LOCAL FIRE DEPARTMENT. REFER TO SPEC. SECTION 28 31 00.

C. ALL PRIMARY CONDUCTORS, LOAD BREAK ELBOWS, TERMINATIONS AT RISER POLE, METERING CABINET TRANSFORMERS, AND JUNCTION BOXES SHALL BE PROVIDED BY POWER CO. ALL WORK SHALL BE COORDINATED WITH SOUTHWEST CITY SCHOOLS AND THE POWER CO.

D. NEW BUILDING SHALL BE PROVIDED WITH LIGHTNING PROTECTION SYSTEM PER SPEC SECTION 26 41 00.



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RICHARD L. PAVLAK
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City Administrator _____
Service Director _____
Review for the City of Grove City Jackson _____
Township Fire Department _____

DEVELOPMENT PLAN
CITY PROJECT NO._____

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SOUTH-WESTERN CITY SCHOOL DISTRICT
3805 Marlane Drive, Grove City, OH 43123

ELECTRICAL UTILITY SITE PLAN

DATE 06-13-14

E002A

6"-1" REFERENCE LINE

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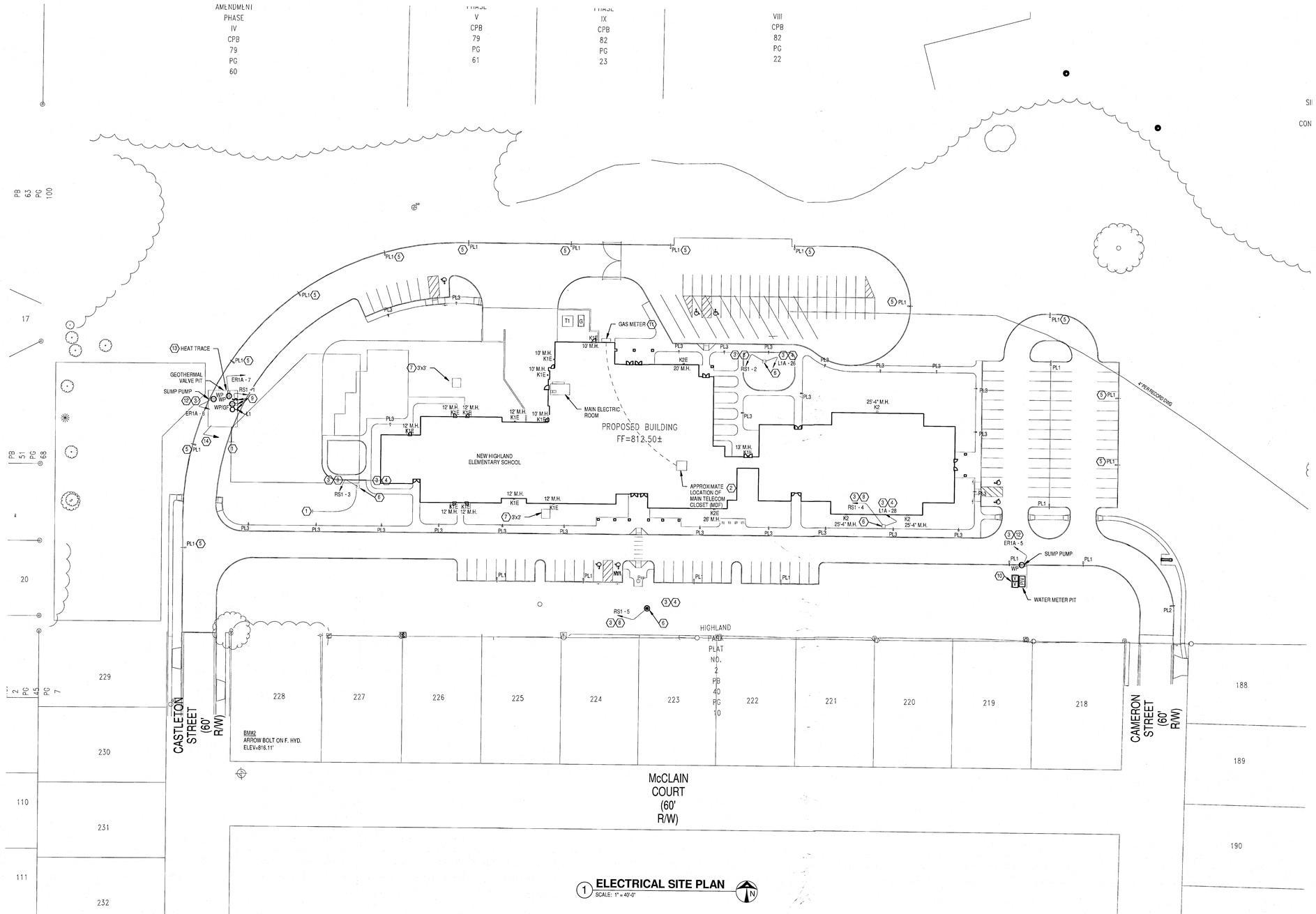

1 **ELECTRICAL SITE PLAN**
SCALE: 1" = 40'-0"

NOTES

1. PROVIDE STUBBED 2" CONDUIT (WITH PULLWIRE) CAPPED AT 30" BELOW GRADE; INDICATE WITH FLUSH GRADE LOCATING PIN.
2. APPROXIMATE LOCATION OF MAIN TELECOM CLOSET (MDF) LOCATED ON SECOND FLOOR. REFER TO ARCHITECTURAL PLANS FOR EXACT LOCATION.
3. ALL CONDUITS INSTALLED UNDER DRIVEWAYS AND PARKING AREAS WHERE AUTOMOBILE TRAFFIC PASSES THROUGH SHALL BE CONCRETE ENCASED.
4. RUN 20A, 277V-1PH LIGHTING CIRCUIT WITH 2-#8, 1-#8 GRD. IN COMMON 1.5" CONDUIT WITH RECEPTACLE CIRCUIT TO EXTERIOR LIGHTING PULLBOX (NOTE 7, THIS SHEET). EXTEND FROM PULLBOX TO PANEL IN MAIN ELECTRIC ROOM AS INDICATED. RUN LIGHTING BRANCH CIRCUITS THRU EXTERIOR LIGHTING CONTROLS PER DETAILS ON SHEET E005.
5. PROVIDE HOUSE SIDE SHEILD ON THIS LUMINARE.
6. FLUSH GRADE PULLBOX ENCLOSURE WITH GREEN GASKETED COVER WITH APPROPRIATE LOGO, PER DETAIL D, SHEET E003.
7. FLUSH GRADE PULLBOX PER NOTE 6, THIS SHEET. PULLBOX CONTAINS ALL EXTERIOR LIGHTING (AND RECEPTACLE) CONDUITS; EXTEND 2-4" CONDUITS FROM THIS PULLBOX TO MAIN ELECTRIC ROOM TO SERVE EXTERIOR LIGHTING AND EXTEND 2-4"C. FROM THIS PULLBOX TO SERVE EXTERIOR RECEPTACLE CIRCUITS. PROVIDE DIVIDER PLATE INSIDE PULLBOX TO SEGRAGATE THE LIGHTING AND RECEPTACLE CIRCUITS AND PROVIDE LABEL ON WIRING TO INDICATE BRANCH CIRCUITS. REFER TO NOTES ON THIS SHEET.
8. RUN 20A, 120V RECEPTACLE CIRCUIT WITH 2-#8, 1-#8 GRD., IN COMMON 1.5" CONDUIT WITH LIGHTING CIRCUIT TO EXTERIOR LIGHTING PULLBOX (NOTE 7, THIS SHEET). EXTEND FROM PULLBOX TO PANEL IN MAIN ELECTRIC ROOM AS INDICATED.
9. VERIFY EXACT MOUNTING LOCATION OF WORK LIGHT, SWITCH AND RECEPTACLE WITH H.C. PRIOR TO ROUGH-IN AND PROVIDE ACCORDINGLY.
10. E.C. SHALL PROVIDE 2-1"C. WITH FIRE ALARM WIRING FROM FIRE ALARM DEVICES MOUNTED IN WATER METER PIT INTO BUILDING AND TO MAIN FIRE ALARM PANEL FOR MONITORING FRIE ALARM DEVICES. WIRE IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS.
11. PROVIDE 1.5" EMPTY CONDUIT (WITH PULLWIRE) FROM GAS METER TO MAIN MDF CLOSET. VERIFY EXACT LOCATION OF GAS METER AND END OF RUN WITH DIV. 23 CONTRACTOR PRIOR TO ROUGH-IN. LABEL EACH END OF PULLWIRE TO READ 'GAS METER'.
12. PROVIDE WEATHERPROOF RECEPTACLE WITH 120V-1PH BRANCH CIRCUIT WITH (2-#8, 1-#8 GRD. IN 1"C.) TO SERVE NEW SUMP PUMP. RUN CIRCUIT TO PANEL INDICATED.
13. E.C. SHALL PROVIDE 20A, 120V HEAT TRACE CIRCUIT WITH 2-#8, 1-#8 GRD., IN 1"C. RUN FROM EMERGENCY POWER PANEL LOCATED IN MAIN ELECTRIC ROOM. PROVIDE GROUND FAULT PROTECTED TYPE BREAKER IN PANEL TO SERVE THIS CIRCUIT.
14. E.C. SHALL PROVIDE 1.5" EMPTY CONDUIT (WITH PULLSTRING) FROM GEOTHERMAL VALVE PIT TO MAIN MECHANICAL ROOM FOR CONTROL WIRING. VERIFY STUB END LOCATION OF CONDUIT IN VALVE PIT AND MECHANICAL ROOM WITH HC PRIOR TO ROUGH-IN AND PROVIDE ACCORDINGLY.

GENERAL NOTES:

A ALL UNDERGROUND CONDUITS AND DUCTBANKS SHALL BE DIRECT BURIED PER DETAIL D, ON SHEET E003 UNLESS INDICATED OTHERWISE. ALL PRIMARY AND SECONDARY CONDUITS AND DUCTBANKS SHALL HAVE LONG SWEEPING BENDS. ALL CONDUITS BURIED UNDER DRIVEWAYS AND PARKING AREAS WHERE AUTOMOBILE TRAFFIC PASSES THROUGH SHALL BE CONCRETE ENCASED. PROVIDE ALL CONDUITS WITH PULLWIRE; ALL CONDUITS SHALL BE 1.5" UNLESS INDICATED OTHERWISE. E.C. SHALL UTILIZE COMMON TRENCH(ES) WHERE EVER FEASIBLE.

B E.C. SHALL PROVIDE EXTERIOR MOUNTED WEATHERPROOF FIRE ALARM AUDIOVISUAL DEVICE ON THE OUTSIDE OF THE BUILDING AS DIRECTED BY LOCAL FIRE DEPARTMENT. REFER TO SPEC. SECTION 28 31 00.

C ALL PRIMARY CONDUCTORS, LOAD BREAK ELBOWS, TERMINATIONS AT RISER POLE, METERING CABINET TRANSFORMERS, AND JUNCTION BOXES SHALL BE PROVIDED BY POWER CO. ALL WORK SHALL BE COORDINATED WITH SOUTHWEST CITY SCHOOLS AND THE POWER CO.

D NEW BUILDING SHALL BE PROVIDED WITH LIGHTNING PROTECTION SYSTEM PER SPEC SECTION 26 41 00.

CALL 811
MINIMUM 2 WORK DAYS BEFORE YOU DIG
UTILITIES PROTECTION SERVICE

LUMINAIRES

MARK	QUANTITY: FLUORESCENT	INCANDESCENT	H.I.D.	L.E.D.	LAMPS: WATTS / LAMP	CATALOG NO.	COLOR	LOAD (VA)	FIXTURE VOLTAGE	MANUFACTURER	CATALOG NO.	OTHER ACCEPTABLE MANUFACTURERS	DIFFUSING MEDIA	TRIM COLOR: WHITE	BLACK	ALUMINUM	BRONZE	STANDARD	SEE NOTE	MOUNTING: S-SURFACE R-RECESSED SM-STEM MTD WM-WALL MTD C-CHAIN MTD UC-UNDER CAB CS-CEIL SURFACE CM-CABLE MOUNT	DIAMETER	SIZE: WIDTH	LENGTH	DEPTH	SEE NOTE
K1E				1	60	LED	3500K	60	277	KIM	#WD14-D-3-60-L3K-277-DB	LITHONIA, WIDELITE, BEACON, GARDCO, INVUE	TEMPERED LENS				•					13"	14.5"	6.5"	7,10
K2				1	120	LED	3500K	120	277	KIM	#WD18-D-3-120-L3K-277-DB	LITHONIA, WIDELITE, BEACON, GARDCO, INVUE	TEMPERED LENS				•			WM (7)		17"	18"	8.75"	7,10
K2E				1	120	LED	3500K	120	277	KIM	#WD18-D-3-120-L3K-277-DB	LITHONIA, WIDELITE, BEACON, GARDCO, INVUE	TEMPERED LENS				•			WM (7)		17"	18"	8.75"	7,10
PL1				1	96	LED	4000K	96	277	KIM	#1SA-ALT96-96L4K277-DB-SF	LITHONIA, WIDELITE, LSI, HOLOPHANE, GARDCO, McGRAW EDISON	1 TYPE 3 OPTIC WITH TEMPERED GLASS LENS				•			20' SQ. POLE W/CONCRETE BASE		16"	22"	8"	8,23,25,27,32
PL2				1	96	LED	4000K	96	277	KIM	#1SA-ALT96-96L4K277-DB-SF	LITHONIA, WIDELITE, LSI, HOLOPHANE, GARDCO, McGRAW EDISON	1 TYPE 4 OPTIC WITH TEMPERED GLASS LENS				•			20' SQ. POLE W/CONCRETE BASE		16"	22"	8"	8,23,25,27,32
PL3				1	60	LED	4000K	60	277	KIM	#1SA-ALT60-60L4K277-DB-SF	LITHONIA, WIDELITE, LSI, HOLOPHANE, GARDCO, McGRAW EDISON	1 TYPE 3 OPTIC WITH TEMPERED GLASS LENS				•			12' SQ. POLE W/CONCRETE BASE		12"	17"	6"	4,8,23,27,32

LUMINAIRE SCHEDULE NOTES

4 PROVIDE CONCRETE POLE BASE PER DETAIL "L" SHEET E003.

7 INSTALL LUMINAIRE AT MOUNTING HEIGHT AS INDICATED ON PLAN. VERIFY FINAL LOCATION WITH ARCHITECT PRIOR TO ROUGH-IN TO AVOID CONFLICT WITH ARCHITECTURAL AESTHETICS.

8 EACH POLE SHALL BE SIZED TO ACCOMMODATE EPA OF COMPLETE LUMINAIRE/POLE ASSEMBLY FOR WIND VELOCITY OF 90 MPH AND GUSTING WIND EQUIVALENT OF 117 MPH. E.C. SHALL TOUCH UP ALL PAINT ON SITE AFTER INSTALLATION.

10 PROVIDE FIXTURE COMPLETE WITH LENS, FUSING, COLD WEATHER BALLAST, RECESSED BACKBOX AND WALL ACCESSORIES FOR A COMPLETE INSTALLATION.

23 MANUFACTURER SHALL SUBMIT POINT-TO-POINT AIMING DRAWINGS OF THE TOTAL PROJECT AREA INDICATING ORIENTATION OF EACH LUMINAIRE'S OPTIC ASSEMBLY. ORIENTATION INDICATED ON PLAN REFERS TO DIRECTION OF LUMINAIRES AS REFERENCED TO ASSOCIATED POLE. LOCATE ASSEMBLIES AS INDICATED ON PLAN IN CONFORMANCE WITH MANUFACTURERS RECOMMENDED OPTIC ORIENTATION.

25 PROVIDE CONCRETE POLE BASE PER DETAIL "K", SHEET E003.

27 PROVIDE DUPLEX RECEPTACLE IN POLE DIRECTLY ABOVE HANDHOLE FOR EACH ASSEMBLY.

32 PROVIDE FIXTURE WITH COLD WEATHER BALLAST.

STATE OF OHIO
RICHARD L. PAVLAK
47352
REGISTERED
PROFESSIONAL ENGINEER

Heapy Engineering
MEP Design Technology Planning Commissioning Energy
Nationally Recognized Leader in Sustainability
PROJECT NO. 2012-07072.09

SHP LEADING DESIGN

4805 Montgomery Road Cincinnati, Ohio 45212	Suite 400 513-381-2112		
236 High Street Hamilton, Ohio 45011	513-863-5441		
250 Civic Center Drive Columbus, Ohio 43215	Suite 200 614-223-2124		
1675 Broadway Denver, Colorado 80202	Suite 1300 303-209-7866		

City Administrator _____
Service Director _____
Review for the City of Grove City Jackson _____
Township Fire Department _____

DEVELOPMENT PLAN
CITY PROJECT NO._____

HIGHLAND PARK ELEMENTARY SCHOOL
2600 Cameron Street, Grove City, OH 43123

SOUTH-WESTERN CITY SCHOOL DISTRICT
3805 Marlane Drive, Grove City, OH 43123

ELECTRICAL POWER & LIGHTING SITE PLAN
DATE 06-13-14
E002B

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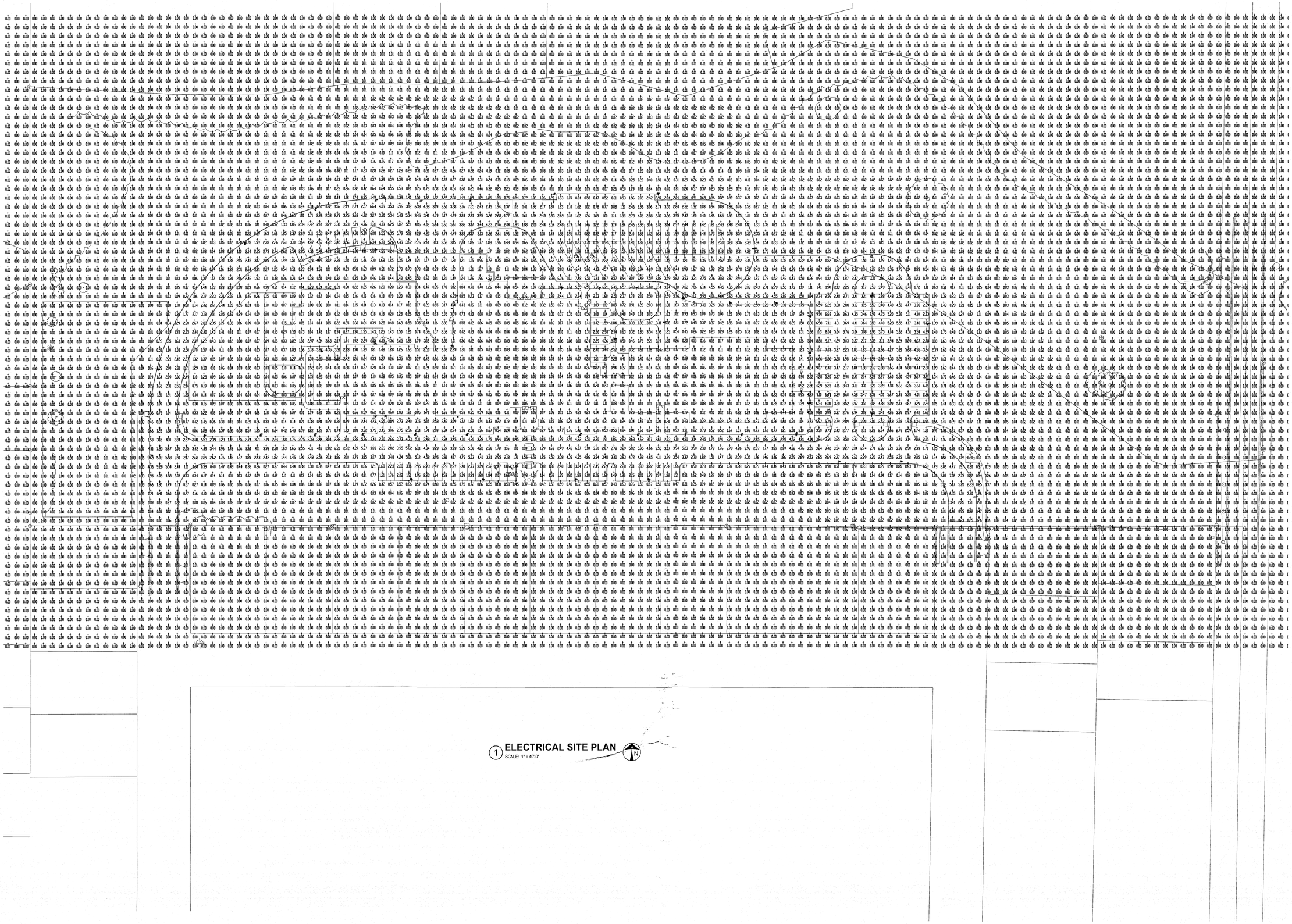

1 ELECTRICAL SITE PLAN
SCALE: 1" = 40'-0"

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SHP
LEADING DESIGN
4655 Montgomery Road
Cincinnati, Ohio 45212
Suite 400
513-381-2112
235 High Street
Hamilton, Ohio 45011
513-863-5441
250 Civic Center Drive
Columbus, Ohio 43215
Suite 200
614-223-2124
1675 Broadway
Denver, Colorado 80202
Suite 1300
303-209-7866

SOUTH-WESTERN CITY SCHOOL DISTRICT
HIGHLAND PARK ELEMENTARY SCHOOL
2600 Cameron Street, Grove City, OH 43123

SOUTH-WESTERN CITY SCHOOL DISTRICT
3805 Marlane Drive, Grove City, OH 43123

ISSUANCES	
06-13-14	DESIGN DEVELOPMENT

ELECTRICAL LIGHTING CALCULATIONS

DATE 06-13-14

COMM NO. 2012014.09

E002L

Heapy Engineering
MEP Design Technology Planning Commissioning Energy
Nationally Recognized Leader in Sustainability
PROJECT NO. 2012-07072.09
"0'-1" REFERENCE LINE"

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SHP
LEADING DESIGN

RECEIVED
JUL 23 2014
GC PLANNING COMMISSION

July 23, 2014

Ms. Kimberly Shields, AICP
Planning / GIS Specialist
Development Department
4035 Broadway, Grove City, Ohio 43123

RE: South-Western City Schools
Highland Park Elementary School
2600 Cameron Street, Grove City, Ohio 43123
Development Plan Application Control Number: 201406300029
SHP Commission Number: 2012014.09

Dear Ms. Shields,

Thank you for your review comments dated July 11, 2014 regarding the above referenced project. My responses correspond to your sections and numbered items.

Development Department

1. The parking spaces off the main drive are being used for visitor and ADA parking and need to remain as currently designed because of immediate adjacency to the main entrance which is the secure entry point on scheduled hours.
2. Refer to revised Sheet C100.
3. The recreation trail can be added by Grove City in the future and the District will work with you to development an easement which would include maintenance on your part.
4. Refer to revised Sheet C100.
5. No action required.
6. Refer to revised Sheet C100.
7. Dumpster gates are not included with this design and were not included and approved on previous recently submitted elementary schools.
8. Refer to revised Sheet C100.
9. The new playground design is consistent in size with previous recently submitted elementary schools, which includes the hard surface area shown on Sheet L102.

Parks and Recreation Department

10. The recreation trail can be added by Grove City in the future and the District will work with you to development an easement which would include maintenance on your part.
11. The existing baseball diamond is underutilized and will be demoed and not replaced.
12. The new playground design is consistent in size with previous recently submitted elementary schools, which includes the hard surface area shown on Sheet L102.

Urban Forestry

13. Refer to revised Sheet L100.
14. Refer to revised Sheet L100.

15. Per Ed Melvin (SHP Leading Design, Landscape Architect) 7/21/14 phone conversation with Jodde Lowe the landscape design as originally submitted is acceptable and meets code.
16. Refer to Sheet L100 as trees are provided in each parking island as required.
17. Refer to revised Sheet L100.
18. Refer to revised Sheet L100.

Engineering, EMH&T

19. Refer to revised Sheet Z201 for the building light fixtures, Sheet E002B for site lighting and building locations with descriptive information on the Luminaires schedule, the new Sheet E002L for lighting calculation, and the supplementary information 8-1/2" x 11" document that includes the lighting cut sheets.
20. Curbing will be 18" barrier curb or an integral 6" curb and walk.
21. Refer to revised Sheet C100.
22. Curbing is provided along the parking lot to prevent cars from driving into the dry detention basin.
23. The sanitary service has been revised to keep construction activities on the school's property. The existing fences and trees within the public sanitary easement will remain in place. The proposed sanitary service will connect to the existing service that enters an existing manhole per the City's sanitary tap records.
24. The proposed sanitary sewer for the site will be all privately maintained by the District.
25. All known easements have been identified on site drawings. An existing 15' easement is identified on the City's record drawing GC-129.
26. Grove City standard drawings will be referenced on the construction plans.
27. Per our meeting with Kyle Rauch, a 6' walk will be added to maintain community connectivity to the playground areas. Refer to revised Sheet C100.
28. Per our meeting with Kyle Rauch, a 6' walk will be added to maintain community connectivity to the playground areas. Refer to revised Sheet C100.
29. Refer to revised Sheet C100.
30. Refer to revised Sheet C104.
31. The 100yr flood limits have been labeled. Refer to revised Sheet C100.
32. This project does not contain a retention area therefore screening or fencing is not required.
33. Ohio EPA NPDES permit will be obtained prior to land disturbance. Once obtained a copy will be provided as requested.
34. When approval of the hydrodynamic separator is obtained a copy will be provided as requested.
35. Calculations for the SCPZ have been added to the stormwater report and width of the SCPZ labeled on the plans.
36. Ponding will not exceed 1.0' for flood routing. Information will be included on engineering submission.
37. Tc path for "Post-Undetained" area is shown on Post-developed Drainage Map, just east of the proposed bus lot.
38. Refer to revised stormwater drainage report.
39. Refer to revised stormwater drainage report.
40. Refer to revised stormwater drainage report.
41. Refer to revised stormwater drainage report.
42. The control outlets for each basin have been updated in the PondPack model to discharge to the proposed outlet pipes.

43. Refer to revised stormwater drainage report.
44. The water quality drawdown calculations are derived from the basin elevations and volumes as reported by PondPack. For each incremental elevation of the basin, an average discharge is generated and the incremental drawdown computed. The incremental drawdown times are then summed to compute the total drawdown. The drawdown graph is provided as part of the stormwater management report with the 50% drain time labeled.

Jackson Township Fire Department

45. Information will be included on building permit submission.

Feel free to contact me anytime if you have further questions or concerns.

Sincerely,
SHP Leading Design

Michael Parkinson, AIA

RECEIVED
JUL 23 2014
GC PLANNING COMMISSION

Grove City
Board of Zoning Appeals

4035 Broadway
Grove City, Ohio 43123

South-Western City School District

3805 Marlane Drive
Grove City, Ohio 43123

Richard Avenue Elementary School

3646 Richard Avenue
Grove City, Ohio 43123

Table of Contents

Exterior Manufacturers, Materials, and Site Furnishings
Specification 101300 Directories (Site Sign)
Site Lighting Cut Sheets

City Administrator	_____
Service Director	_____
Review for the City of Grove City Jackson	_____
Township Fire Department	_____

June 13, 2014

SHP
LEADING DESIGN

June 13, 2014

Exterior Manufacturers, Materials, and Site Furnishings

Standing Seam Metal Roof
Manufacturer: DMI
Color: Beige

Cast Iron Downspout Boots
Manufacturer: Neenah
Color: Custom color to match DMI's Putty

Gutters, Downspouts, Rake, and Fascia
Manufacturer: DMI
Color: Putty

Windows and Storefront
Manufacturer: EFCO
Color: Custom color to match DMI's Putty

Metal Coping
Manufacturer: Metal-Era
Color: Custom color to match DMI's Putty

Curtain Wall
Manufacturer: Kawneer
Color: Custom color to match DMI's Putty

www.shp.com

CINCINNATI
4805 Montgomery Road Suite 400
Cincinnati, Ohio 45212
513.381.2112 main
513.381.5121 fax

HAMILTON
236 High Street
Hamilton, Ohio 45011
513.863.5441 main
513.863.5596 fax

COLUMBUS
250 Civic Center Drive Suite 200
Columbus, Ohio 43215
614.223.2124 main
614.223.2130 fax

Steed Hammond Paul Inc.

Louvers
Manufacturer: Airolite
Color: Custom color to match DMI's Putty

Metal Wall Panels
Manufacturer: AEP
Color: Custom color to match DMI's Putty

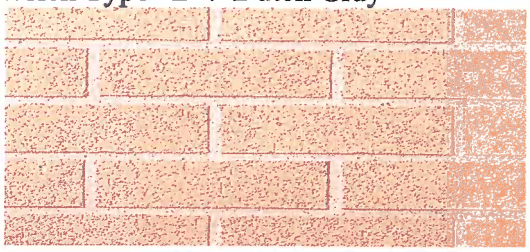
Overhead Coiling Doors
Manufacturer: Wayne-Dalton
Color: Custom color to match DMI's Putty

Hollow Metal Doors and Frames
Manufacturer: Ceco Door Products
Color: Custom color to match DMI's Putty

Site Sign Directory
Manufacturer: Nelson-Harkins, 249-N.
Color: Custom color to match DMI's Putty

Brick
Manufacturer: Belden
Brick Type "A": Commodore

Manufacturer: Belden
Brick Type "B": Dutch Gray



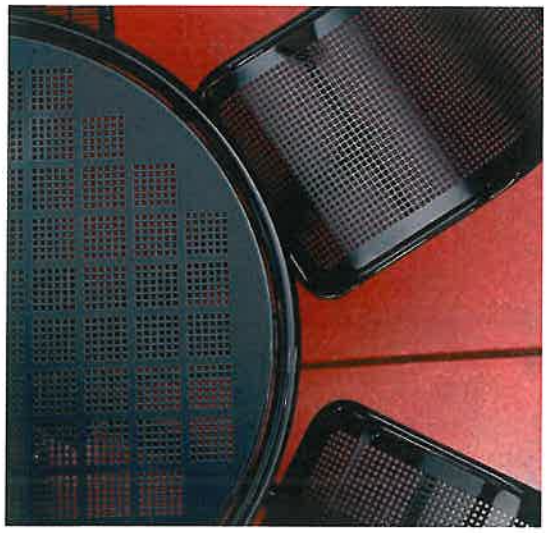
Mortar
Manufacturer: Brixment
Color: C-224

Letters
Manufacturer: Gemini
Color: Dark Bronze

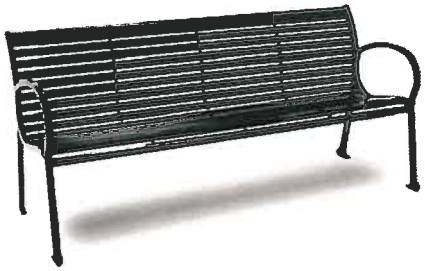
Glazing:
Manufacturer: PPG
Color: Clear

Fiberglass-Sandwich Panel
Manufacturer: Kalwall
Color: White

Tables – 3 seat Carousel
Manufacturer: Landscape Forms
Color: Bronze



Benches - Scarborough
Manufacturer: Landscape Forms
Color: Bronze



Bike Racks - Flo
Manufacturer: Landscape Forms
Color: Bronze

SECTION 101300 - DIRECTORIES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Special Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Nonilluminated, changeable-letter, single / double-sided directories.

B. Related Sections:

1. Section 018113 "Sustainable Design Requirements" for general Project LEED requirements and for additional LEED requirements specifically applicable to this Section.
2. Section 017419 Section "Construction Waste Management and Disposal" for additional LEED requirements for handling of construction waste, general waste, excess materials, packaging, and recyclables.
3. Section 042000 "Unit Masonry" for masonry structure supporting the ground sign.
4. Section 101100 "Visual Display Units" for tackboards.

1.3 PERFORMANCE REQUIREMENTS

A. Structural Performance: Directories shall withstand the effects of gravity loads and the following loads and stresses within limits and under conditions indicated according to ASCE/SEI 7.

B. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes. Base calculations on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.

1. Temperature Change (Range): 120 deg F, ambient; 180 deg F, material surfaces.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product indicated. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for directories.

B. Shop Drawings: For directories. Include plans, elevations, sections, details, and attachments to other work.

1. Include sections of typical trim members.
2. Provide text and logo layout for permanent header of each sign in the required typestyles at least half size.

C. Samples for Initial Selection: Manufacturer's color charts consisting of actual units or sections of units showing the full range of colors available for the following:

1. Fabric swatches for letterboards.
2. Section of header panel for color selection.

A. Samples for Verification: For each of the following products and for the full range of color, texture, and sign material indicated, of sizes indicated:

1. Letterboards: Not less than 8-1/2 by 11 inches, mounted on substrate indicated for final Work. Include one panel for each type, color, and texture required.
2. Trim: 6-inch- long sections of each trim profile.
3. Letters: Full-size Samples of changeable letters of each size specified.

1.5 INFORMATIONAL SUBMITTALS

A. Warranty: Special warranty specified in this Section.

1.6 CLOSEOUT SUBMITTALS

A. Maintenance Data: Include maintenance manuals.

B. Lettering and symbols catalog to be included in Operations Manual indicating total line of lettering fonts, numerals and symbols available for use in this letterboard system and address, telephone and e-mail of source for purchase.

1.7 QUALITY ASSURANCE

A. Installer Qualifications: An authorized representative of the manufacturer for installation and maintenance of units required for this Project.

B. Source Limitations: Obtain directories from single source from single manufacturer.

1.8 PROJECT CONDITIONS

A. Field Measurements: Verify recessed openings by field measurements before fabrication and indicate measurements on Shop Drawings.

B. Weather Limitations: Proceed with installation only when existing and forecasted weather conditions permit installation of signs to be performed according to manufacturers' written instructions and warranty requirements.

1.9 COORDINATION

A. Coordinate installation of anchorage for directories. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, masonry inserts, anchor bolts, and items with integral anchors that are to be embedded in concrete or masonry. Deliver such items to Project site in time for installation.

1.10 WARRANTY

A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components that fail in materials or workmanship within specified warranty period.

1. Failures include, but are not limited to, the following:

   a. Structural failures of cabinets, access doors or frames.
   b. Faulty operation of hardware or illumination system.
   c. Deterioration of metals, metal finishes, and other materials beyond normal weathering.

2. Warranty Period: Five years from date of Contract Completion.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Aluminum: Alloy and temper recommended by aluminum producer and manufacturer for type of use and finish indicated, and as follows:

   1. Sheet: ASTM B 209.
   2. Extruded Shapes: ASTM B 221, Alloy 6063.

B. Clear Acrylic Sheet: ASTM D 4802, Category A-1 (cell-cast sheet), with Finish 1 (smooth or polished), and 6 mm thick unless otherwise indicated; colorless sheet with visible light transmittance of 92 percent measured per ASTM D 1003.

C. Translucent Acrylic Sheet: ASTM D 4802, Category A-1 (cell-cast sheet), with Finish 1 (smooth or polished), and 6 mm thick unless otherwise indicated; white colored sheet of density required to produce uniform brightness and minimum halation effects.

D. Opaque Acrylic Sheet: ASTM D 4802, Category A-1 (cell-cast sheet), with Finish 1 (smooth or polished), and 6 mm thick unless otherwise indicated; colors as indicated.

A. Fasteners: Provide stainless-steel or aluminum screws, bolts, and other fastening devices made for exterior applications. Provide types, sizes, and lengths to suit installation conditions. Use security fasteners where exposed to view.

2.2 CHANGEABLE-LETTER DIRECTORIES

A. Enclosed-Face, Non-Illuminated Changeable-Letter Directory: Factory-fabricated, weather-resistant unit consisting of manufacturer's standard, 3-inch- deep perimeter frame with fixed letterboard on back inside surface and with glazed doors. Provide (1) unit – refer to drawings for width, height, and required type (single or double-faced unit).

   1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

      a. Nelson-Harkins Industries; 248-N.
      b. Poblocki Sign Company; Model-E.
      c. Tablet & Ticket Co. (The); 950E Series.

   2. Aluminum Perimeter Frame: Extruded aluminum with weather-resistant backing for exterior use.

      a. Perimeter Frame Profile: Square.
      b. Perimeter Frame Corners: Square.
      c. Finish: Baked enamel.

d. Color: Custom color to match Dimensional Metals, Inc. "Putty".

3. Glazed, Hinged Doors: Clear acrylic sheet set in door frame equipped with full-height continuous hinge and manufacturer's standard lock with two keys. Provide factory-applied weather stripping on doors for exterior use. Provide heavy-duty, spring-loaded or pneumatic door stays at each side of door. Each door stay shall have a minimum load capacity of 30 pounds.

   a. Door Frame: Same material and finish as perimeter frame.
   b. Number of Doors: One, hinged at top, with locks.
   c. Cam Lock cores shall be CompX # M4-7054-010-B-N90-D-P. Keyed in range RD700 thru RD800. No substitutions. CompX Cam Lock Cylinder assembly may vary based on application.

4. Header Panel: Non-illuminated; with opaque, acrylic sheet panel set within overall perimeter frame; with matching frame that separates header panel from letterboard.

   a. Graphic Content and Style: Provide header panel copy that complies with requirements indicated on Drawings including two-color logo. Artwork for logos will be supplied on electronic media by Architect.
   b. Color: Match Architect's sample.

5. Letterboard: Manufacturer's standard vinyl-covered panel material, with grooves spaced at 1/4 inch o.c. to receive changeable letters.

   a. Color: Black.

6. Letters: Molded plastic with tabs for engaging grooves in letterboard. Provide manufacturer's standard assortment of not less than 1200 characters for each size, style, color, and case required; include letters, numbers, and characters. Package letters in compartmentalized carrying box.

   a. Height: 3 inches to top of capitals.
   b. Style: Roman.
   c. Color: White.
   d. Case: All capitals.

7. Width and height and installation conditions as indicated on Drawings.

2.3 FABRICATION

A. Fabricate directories to requirements indicated for dimensions, design, and thickness and finish of materials. Use metals and shapes of thickness and reinforcement to produce flat surfaces, free of oil canning, and to impart strength for size, design, and application indicated.

B. Fabricate directory cabinets and door frames with reinforced corners, mitered and welded to a hairline fit, with no exposed fasteners. Provide structural reinforcement to prevent racking and misalignment.

C. Fabricate exterior directories with vents to permit evaporation of moisture trapped inside.

D. Provide hold-open arms for doors of top-hinged directories.

E. Provide continuous rigid aluminum top cap with center ridge and drainage slope toward each face; turn down and provide drip edge. Match finish and color of header panel.

2.4 GENERAL FINISH REQUIREMENTS

A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.

B. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.

C. Appearance of Finished Work: Noticeable variations in same piece are not acceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

2.5 ALUMINUM FINISHES

A. Baked-Enamel or Powder-Coat Finish: AAMA 2603 except with a minimum dry film thickness of 1.5 mils. Comply with coating manufacturer's written instructions for cleaning, conversion coating, and applying and baking finish.

PART 3 - EXECUTION

3.1 GENERAL

A. Comply with Division 01 Sections 017419 and 018113 and other requirements for attaining the LEED certification level specified.

3.2 EXAMINATION

A. Examine mounting substrates, with Installer present, for compliance with requirements for installation tolerances, surface conditions of substrate, and other conditions affecting performance of the Work.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.3 INSTALLATION

A. General: Install directories in locations and at mounting heights indicated on Drawings. Keep perimeter lines straight, level, and plumb. Provide grounds, clips, backing materials, adhesives, brackets, anchors, trim, and accessories necessary for complete installation.

3.4 ADJUSTING AND CLEANING

A. Adjust directory doors to operate smoothly without warp or bind and so that contact points meet accurately. Lubricate operating hardware as recommended by manufacturer.

B. Touch up factory-applied finishes to restore damaged or soiled areas.

3.5 WASTE DISPOSAL

A. Comply with Waste Management requirements of Section 017419 "Construction Waste Management and Disposal".

END OF SECTION 101300

Reset Form

KIM LIGHTING

WD14

14″ Wall Director®, Electronic-LED

revision 7-12-10 • kim_wd14led_spec.pdf

Type:
Job:
Catalog number:

/ / /

Fixture | Electrical Module | Finish | Options

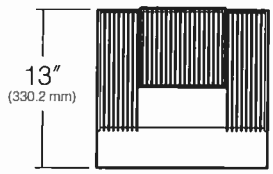
See page 2 — See pages 3-4

Approvals:

Date:

Specifications

WD14-LED
60 Light Emitting Diodes
Total Max System Watts = 73W
Maximum Weight = 26 lbs.



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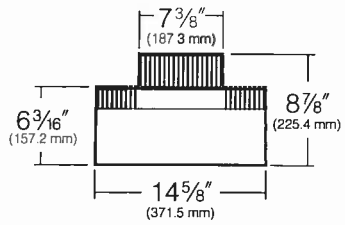
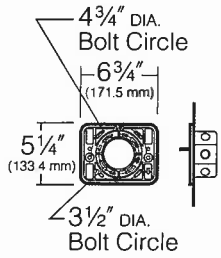
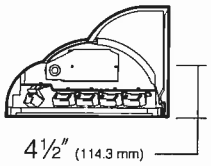


FRONT



Mounting Plate
Attaches directly to any standard 4″ J-box (by others)



SIDE

Reflector Housing: One-piece die-cast, low copper (<0.6% Cu) aluminum alloy with integral cooling fins. Rotates against ballast housing to provide 10° of adjustment with degree markers cast into the housing. At 0° adjustment, lens is totally concealed from view above horizontal with fixture aimed downward.

Ballast Housing: One-piece die-cast, low copper (<0.6% Cu) aluminum alloy with integral cooling fins. Fastens to mounting plate with keyhole slots freeing both hands for securing and wiring. One stainless steel socket-head screw on each side of housing frees the reflector housing to rotate for aiming. Tightening the screws locks the two housings together with sealing provided by a silicone gasket. For visual aiming, adjustment may be accomplished with the fixture on.

Lens Frame: One-piece die-cast, low copper (<0.6% Cu) aluminum alloy with integral hinges and stainless steel pins. Toolless access to reflector housing with sealing provided by a one-piece extruded and vulcanized silicone gasket. Lens is clear flat ³⁄₁₆″ thick tempered glass sealed to lens frame with a silicone gasket and retainer clips. For UP models, lens is mounted flush with frame for water run off, and is silicone sealed.

Electronic Module: All electrical components are UL and CSA recognized, mounted on a single plate and factory prewired with quick-disconnect plugs. Module includes a driver, thermal control device and surge protector.Electrical module attaches to housing with no-tool hinges and latches, accessible by opening the lens frame only. Driver is rated for -40°F starting and has a 0-10V dimming interface for multi-level illumination options.

Optical Module: Precision, replaceable MicroEmitters are positioned to achieve directional control toward desired task. The entire EmitterDeck fastens to the housing as a one-piece module.

Electrical Components: High power factor ballasts are rigidly mounted inside the housing and are factory prewired with a quick-disconnect plug for mating to the socket.

Mounting Plate: Mounting plate attaches directly to any standard 4″ junction box. All mounting plates are die-cast aluminum with reinforced ribs. Two studs are provided in each plate with flange nuts to allow fixture mounting by keyhole slots. Sealant must be applied (by others) between mounting plate and mounting surface to insure a dry junction box.

Finish/Color: Super TGIC thermoset polyester powder coat paint, 2.5 mil nominal thickness, applied over a titanated zirconium conversion coating; A.S.T.M. 2500 hour salt spray test endurance rating. Standard colors are Black, Dark Bronze, Light Gray, Stealth Gray®, Platinum Silver, or White. Custom colors are available.

Warranty: Kim Lighting warrants Wall Director LED products ("Product(s)") sold by Kim Lighting to be free from defects in material and workmanship for (i) a period of five (5) years for metal parts, (ii) a period of ten (10) years for exterior housing paint finish(s), (iii) a period of six (6) years for LED Light Engines and, (iv) a period of five (5) years for LED power components (driver, surge protector and LifeShield™ device), from the date of sale of such goods to the buyer as specified in Kim Lighting shipment documents for each product.

CAUTION: Fixtures must be grounded in accordance with national, state and/or local electrical codes. Failure to do so may result in serious personal injury.

Listings and Ratings			
ETL to UL 1598[1] Standards	IP66 Rated	CE	25°C Ambient

[1]Suitable for wet locations

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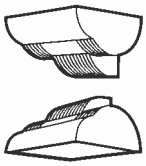


Standard Features

Fixture
Cat. No. designates **WD14** fixture, Up (U) or Down (D) configuration, and light distribution (2, 3 or 4).

WD14 x x

Housing Size:
WD14

Distribution:
☐ U = Up
☐ D = Down

Type:
☐ 2 = Type II
☐ 3 = Type III
☐ 4 = Type IV

Light Distribution:

Type II

Type III

Type IV

Electrical Module

Cat. Nos. for Electrical Modules available:

60 LxK x

Source:
60 = 60 LED's

Color Temperature:[1]
☐ L3K = 3500K
☐ L5K = 5100K
☐ L2K = 580nm - Amber

Voltage:
☐ 120 = 120V
☐ 208 = 208V
☐ 240 = 240V
☐ 277 = 277V
☐ 347 = 347V[2]
☐ 480 = 480V[2]

[1]4300K and 6500K are also available on an "Engineered-to-Order" (ETO) basis.

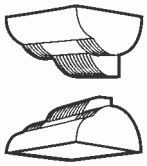
[2]Due to current unavailability of 347V and 480V drivers, specification of these voltages may feature an integral step-down transformer.

Fixture	Total System Watts	Volt	Operating Amps
WD14-Small	73	120	0.61
WD14-Small	73	208	0.35
WD14-Small	73	240	0.30
WD14-Small	73	277	0.26
WD14-Small	73	347	0.21
WD14-Small	73	480	0.15

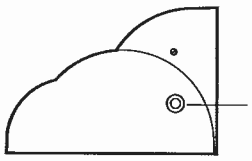
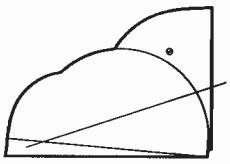
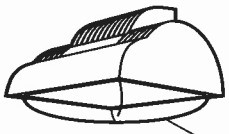
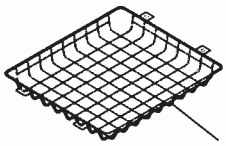
Finish
Super TGIC powder coat paint over a titanated zirconium conversion coating.

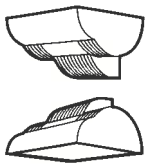
Color:	Black	Dark Bronze	Light Gray	Stealth Gray®	Platinum Silver	White	Custom Color[1]
Cat. No.:	☐ **BL**	☐ **DB**	☐ **LG**	☐ **SG**	☐ **PS**	☐ **WH**	☐ **CC**

[1]Custom colors subject to additional charges, minimum quantities and extended lead times. Consult representative. Custom color description:_____



Optional Features

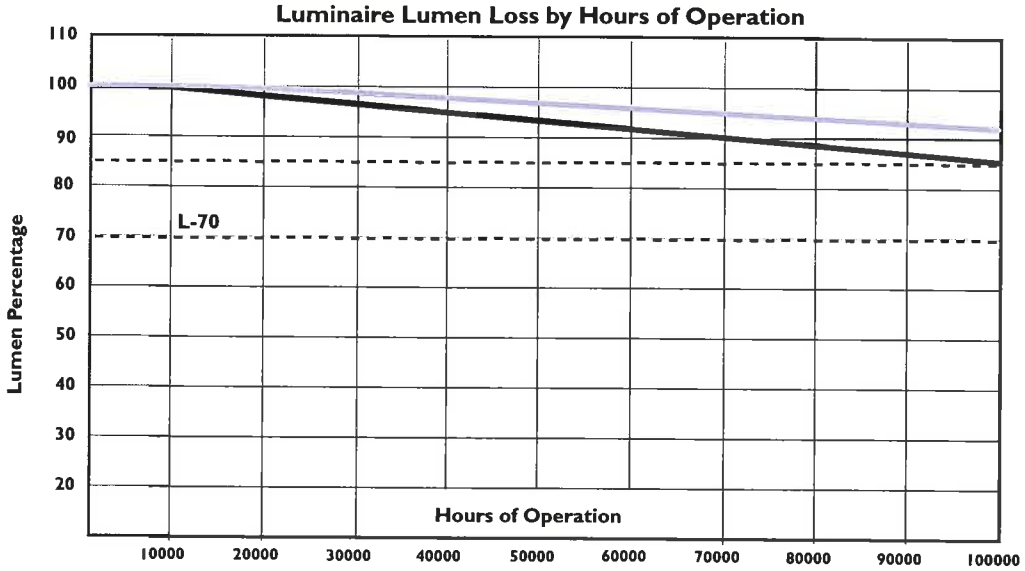
Base Socket Cat. No. ☐ **G12** ☐ **No Option**	G12 base socket available for 70W and 150W Pulse Start Metal Halide lamps only.
Photocell Control Cat. No. **(see right)** ☐ **No Option**	Factory installed inside housing with fully gasketed sensor on side wall. Cat. No. / Line Volts: ☐ **A-30** 120V ☐ **A-31** 208V ☐ **A-32** 240V Cat. No. / Line Volts: ☐ **A-33** 277V ☐ **A-34** 480V ☐ **A-35** 347V  Photocell Control
5° Shield Cat. No. ☐ **5DS14** ☐ **No Option**	Aluminum shield field-attached to lens frame. Maintains a horizontal cutoff fixture edge when the luminaire is tilted 5°. Finished to match the fixture.  5° Shield
Polycarbonate Lens: Cat. No. ☐ **LS** ☐ **No Option**	Clear flat polycarbonate lens replaces standard tempered glass lens. **NOTE:** Use only when vandalism is anticipated to be high. Useful life is limited by UV discoloration from sunlight. A program of regular inspection and periodic replacement is highly recommended to maintain optimum fixture performance.  Polycarbonate Lens
Wire Guard Cat. No. ☐ **WG14** ☐ **No Option**	11 ga. (.12″ dia.) BB Wire, (.75″ sq. welded mesh pattern,) 11⅜″ x 10¼″ x 1½″ deep. Finish is super TGIC thermoset polyester powder coat paint, over zinc plated wireform. Finished to mach the fixture. **NOTE:** Only available with flat lens applications.  Wire Guard
Fusing Cat. No. **(see right)** ☐ **No Option**	Line Volts: 120V 208V 240V 277V 347V 480V Cat. No.: ☐ **SF** ☐ **DF** ☐ **DF** ☐ **SF** ☐ **SF** ☐ **DF**
Surface Conduit Mount Cat. No. ☐ **SCM14U** ☐ **SCM14D** ☐ **No Option**	Cast aluminum junction box and fixture mount for attachment (by others) to existing walls, beams or columns. **SCM14** has one ¾″ NPT conduit tap in each side and bottom. Must be securely mounted to wall surface. Finished to match the fixture. **SCM14U** for UP fixtures only. **SCM14D** for DOWN fixtures only. **Note:** Must be securely mounted to all surface.



Lumen Performance Charts

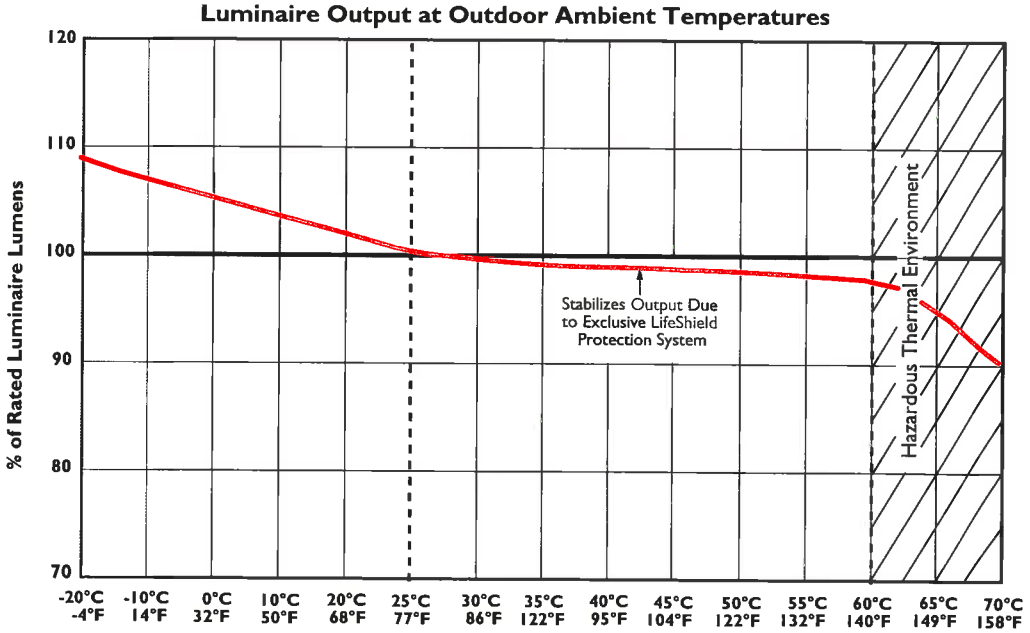
NOTES:

1. Lumen loss stablization is a result of Kim Lighting's MicroEmitter™ luminaires exclusive LifeShield™ Protection System and Dual Heat Management.
2. The LifeShield™ Protection System will lower the current to the LEDs significantly if the luminaire is exposed to direct heat (sun) or excessive abnormal conditions.
3. Luminaire Lumen Loss assumptions are based on LM-80 results and an actual outdoor product testing based upon 5100K CCT, 350mA drive current. 25°C/77°F tab ambient and cathode temperature at 85°C/185°F. Assumptions past 6,000 hours are interpolated.
4. Cathode temperature baseline is at 85°C/185°F. If cathode temperature increases during ambient changes and abnormal environment conditions, % of rated lumens will slightly decrease.
5. Outdoor ambient temperatures are assumed SITU average by geographic region.
6. As Solid State Lighting technology and thermal management systems continually advance, lumen loss projections are subject to improvement.



Outdoor Temperature at 10°C/50°F. Temperature is based on continual average, annual assumptions.

Outdoor Temperature at 40°C/104°F. Temperature is based on continual average, annual assumptions.



Reset Form

KIM LIGHTING

WD18

18″ Wall Director®, Electronic-LED

revision 8-16-10 • kim_wd18led_spec.pdf

Type:
Job:
Catalog number:

/ / /

Fixture | Electrical Module | Finish | Options

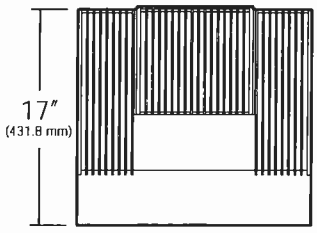
See page 2 — See pages 3-4

Approvals:

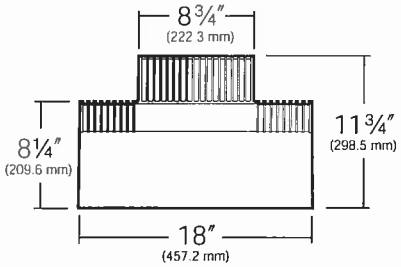
Date:
Page: 1 of 5

Specifications

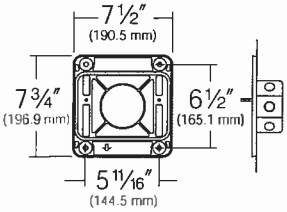
WD18-LED
120 Light Emitting Diodes
Total Max System Watts = 140W
Maximum Weight = 43 lbs.



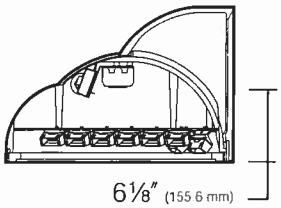
TOP



FRONT



Mounting Plate
must be securely attached to wall outside the J-box perimeter.



to J-box center

SIDE

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Reflector Housing: One-piece die-cast, low copper (<0.6% Cu) aluminum alloy with integral cooling fins. Rotates against ballast housing to provide 10° of adjustment with degree markers cast into the housing. At 0° adjustment, lens is totally concealed from view above horizontal with fixture aimed downward.

Ballast Housing: One-piece die-cast, low copper (<0.6% Cu) aluminum alloy with integral cooling fins. Fastens to mounting plate with keyhole slots freeing both hands for securing and wiring. One stainless steel socket-head screw on each side of housing frees the reflector housing to rotate for aiming. Tightening the screws locks the two housings together with sealing provided by a silicone gasket. For visual aiming, adjustment may be accomplished with the fixture on.

Lens Frame: One-piece die-cast, low copper (<0.6% Cu) aluminum alloy with integral hinges and stainless steel pins. Two stainless steel quarter-turn fasteners secure lens frame to reflector housing with sealing provided by a one-piece extruded and vulcanized silicone gasket. Lens is clear flat 3/16″ thick tempered glass sealed to lens frame with a silicone gasket and retainer clips. For UP models, lens is mounted flush with frame for water run off, and is silicone sealed.

Electronic Module: All electrical components are UL and CSA recognized, mounted on a single plate and factory prewired with quick-disconnect plugs. Module includes a driver, thermal control device and surge protector.Electrical module attaches to housing with no-tool hinges and latches, accessible by opening the lens frame only. Driver is rated for -40°F starting and has a 0-10V dimming interface for multi-level illumination options.

Optical Module: Precision, replaceable MicroEmitters are positioned to achieve directional control toward desired task. The entire EmitterDeck fastens to the housing as a one-piece module.

Mounting Plate: The standard mounting plate is attached to wall (by others) outside the junction box perimeter. All mounting plates are die-cast aluminum with reinforced ribs. Two studs are provided in each plate with flange nuts to allow fixture mounting by keyhole slots. Sealant must be applied (by others) between mounting plate and mounting surface to insure a dry junction box.

Finish: Super TGIC thermoset polyester powder coat paint, 2.5 mil nominal thickness, applied over a titanated zirconium conversion coating; A.S.T.M. 2500 hour salt spray test endurance rating. Standard colors are Black, Dark Bronze, Light Gray, Stealth Gray®, Platinum Silver, or White. Custom colors are available.

Warranty: Kim Lighting warrants Wall Director LED products ("Product(s)") sold by Kim Lighting to be free from defects in material and workmanship for (i) a period of five (5) years for metal parts, (ii) a period of ten (10) years for exterior housing paint finish(s), (iii) a period of six (6) years for LED Light Engines (MicroEmitters) and, (iv) a period of five (5) years for LED power components (LED Driver, LifeShield™ device, Surge Protector), from the date of sale of such goods to the buyer as specified in Kim Lighting shipment documents for each product.

CAUTION: Fixtures must be grounded in accordance with national, state and/or local electrical codes. Failure to do so may result in serious personal injury.

Listings and Ratings			
ETL to UL 1598[1] Standards	IP66 Rated	CE	25°C Ambient

[1]Suitable for wet locations

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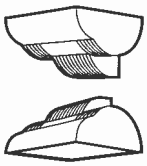


Standard Features

Fixture

Cat. No. designates **WD18** fixture, Up (U) or Down (D) configuration, and light distribution (2, 3 or 4).

WD18 — x — x

Housing Size:
WD18

Distribution:
☐ U = Up
☐ D = Down

☐ 2 = Type II
☐ 3 = Type III
☐ 4 = Type IV

Light Distribution:

Type II

Type III

Type IV

Electrical Module

Cat. Nos. for Electrical Modules available:

120 — LxK — x

Source:
120 = 120 LED's

Color Temperature:[1]
☐ L3K = 3500K
☐ L5K = 5100K
☐ L2K = 580nm - Amber

Voltage:
☐ 120 = 120V
☐ 208 = 208V
☐ 240 = 240V
☐ 277 = 277V
☐ 347 = 347V
☐ 480 = 480V

[1]4300K and 6500K are also available on an "Engineered-to-Order" (ETO) basis.

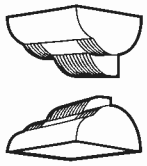
Fixture	Total System Watts	Volt	Operating Amps
WD18-Large	140	120	1.17
WD18-Large	140	208	0.67
WD18-Large	140	240	0.58
WD18-Large	140	277	0.51
WD18-Large	140	347	0.40
WD18-Large	140	480	0.29

Finish

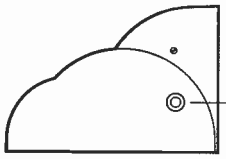
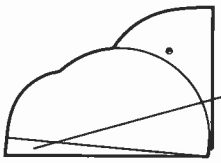
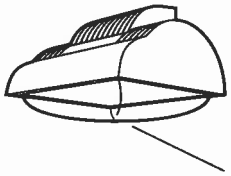
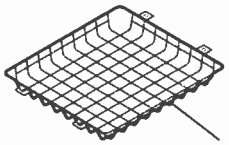
Super TGIC powder coat paint over a titanated zirconium conversion coating.

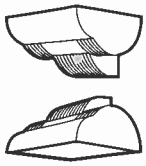
Color:	Black	Dark Bronze	Light Gray	Stealth Gray®	Platinum Silver	White	Custom Color[1]
Cat. No.:	☐ **BL**	☐ **DB**	☐ **LG**	☐ **SG**	☐ **PS**	☐ **WH**	☐ **CC**

[1]Custom colors subject to additional charges, minimum quantities and extended lead times. Consult representative. Custom color description: _____

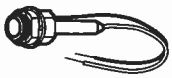
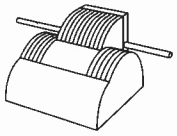
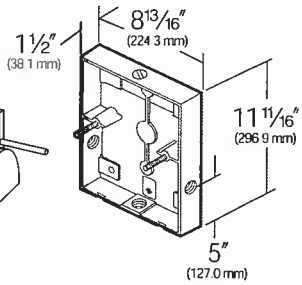


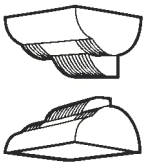
Optional Features

Photocell Control Cat. No. **(see right)** ☐ **No Option**	Factory installed inside housing with fully gasketed sensor on side wall. Cat. No. / Line Volts: ☐ **A-30** 120V; ☐ **A-31** 208V; ☐ **A-32** 240V Cat. No. / Line Volts: ☐ **A-33** 277V; ☐ **A-34** 480V; ☐ **A-35** 347V	 Photocell Control
5° Shield Cat. No. ☐ **5DS18** ☐ **No Option**	Aluminum shield field-attached to lens frame. Maintains a horizontal cutoff fixture edge when the luminaire is tilted 5°. Finished to match the fixture.	 5° Shield
Lexan® Enclosure: Cat. No. ☐ **LS** ☐ **No Option**	**For DOWN fixture models only.** Clear convex vacumm formed Lexan® enclosure with gasket replaces standard tempered glass lens. 250W max. May be used with 400W HPS only in outdoor locations where ambient air temperature during fixture operation will not exceed 85°F. **NOTE:** Use only when vandalism is anticipated to be high. Useful life is limited by UV discoloration from sunlight and MH lamps. A program of regular inspection and periodic replacement is highly recommended to maintain optimum fixture performance.	 Lexan® enclosure
Wire Guard Cat. No. ☐ **WG18** ☐ **No Option**	11 ga. (.12″ dia.) BB Wire, (.75″ sq. welded mesh pattern.) 15″ x 14½″ x 1½″ deep. Finish is super TGIC thermoset polyester powder coat paint, over zinc plated wireform. Finished to match the fixture. **NOTE:** Only available with flat lens applications.	 Wire Guard



Optional Features

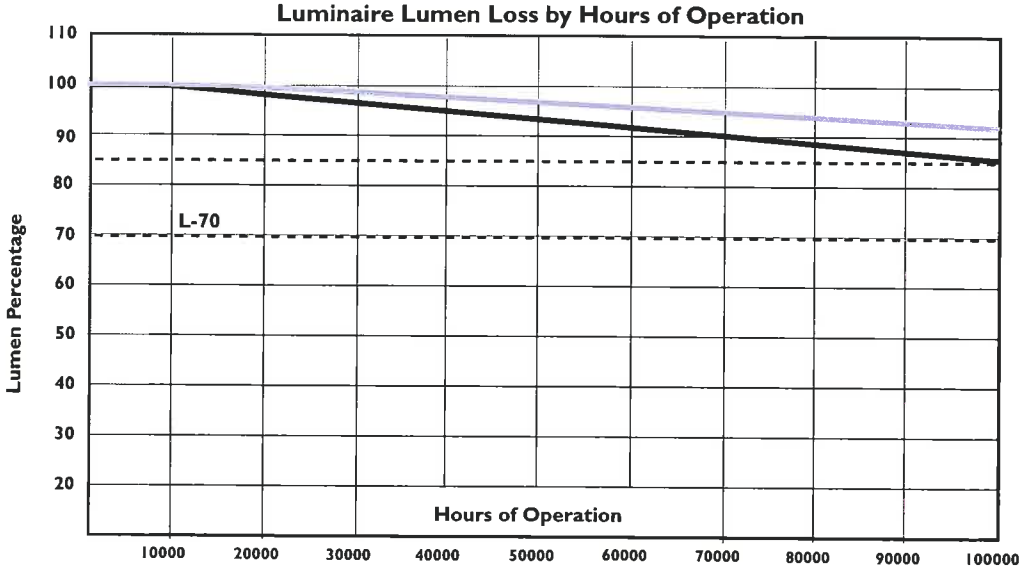
Fusing Cat. No. **(see right)** ☐ **No Option**	Line Volts: 120V 208V 240V 277V 347V 480V Cat. No.: ☐ **SF** ☐ **DF** ☐ **DF** ☐ **SF** ☐ **SF** ☐ **DF** 
Surface Conduit Mount Cat. No. ☐ **SCM18** ☐ **No Option**	Cast aluminum junction box and fixture mount for attachment (by others) to existing walls, beams or columns. **SCM18** has one ¾″ NPT conduit tap in each side, top and bottom. Finished to match the fixture. **SCM18** for all fixtures, UP and DOWN. **Note:** Must be securely mounted to all surface.  

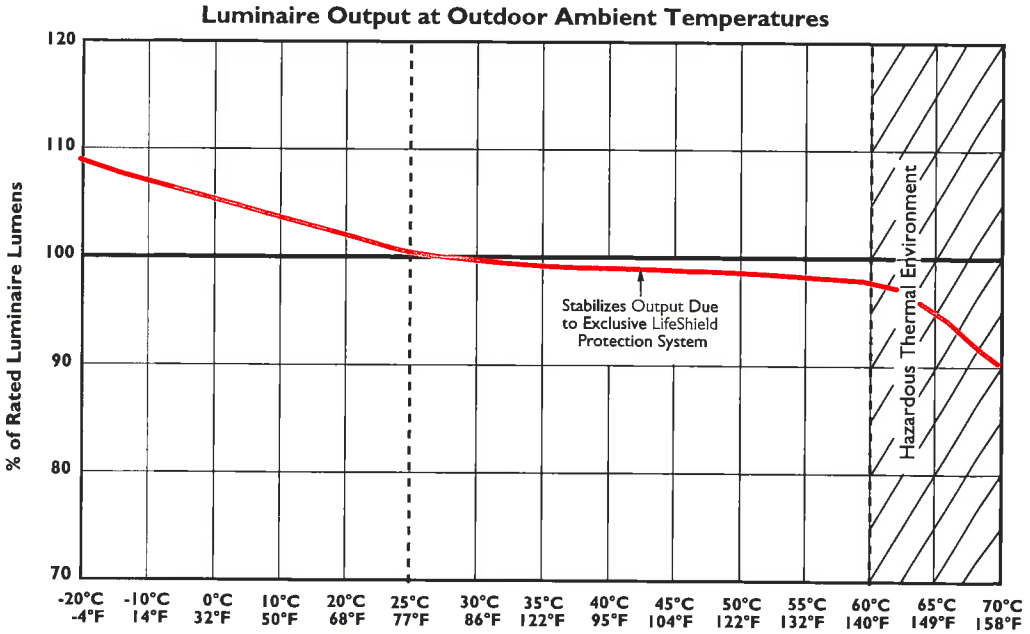


Lumen Performance Charts

NOTES:

1. Lumen loss stablization is a result of Kim Lighting's MicroEmitter™ luminaires exclusive LifeShield™ Protection System and Dual Heat Management.
2. The LifeShield™ Protection System will lower the current to the LEDs significantly if the luminaire is exposed to direct heat (sun) or excessive abnormal conditions.
3. Luminaire Lumen Loss assumptions are based on LM-80 results and an actual outdoor product testing based upon 5100K CCT, 350mA drive current. 25°C/77°F tab ambient and cathode temperature at 85°C/185°F. Assumptions past 6,000 hours are interpolated.
4. Cathode temperature baseline is at 85°C/185°F. If cathode temperature increases during ambient changes and abnormal environment conditions, % of rated lumens will slightly decrease.
5. Outdoor ambient temperatures are assumed SITU average by geographic region.
6. As Solid State Lighting technology and thermal management systems continually advance, lumen loss projections are subject to improvement.



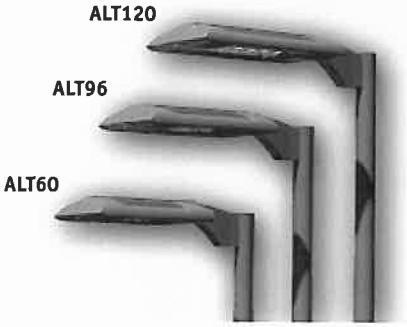


ALTITUDE™

ALT60, ALT96, ALT120 Small LED Luminaire

12' and 20' poles in combination for these fixture types.

SITE / ROADWAY



FEATURES

- The ultimate in LED luminaire design featuring innovative engineering, thermal management and unique patent pending PicoPrism™ optics
- Proportional and scalable aesthetic housing, available in six sizes to cover more environments than ever before
- WiHUBB features on/off/variable and step dimming control, SNAP protocol mesh network, AES-128 encryption detection, occupancy sensor interface and intuitive, user-friendly software

WiHUBB ENABLED

ORDERING INFORMATION (Example)

1SA | ALT3P35 | 120L5K277 | WH | SF/A26 | PRA20-4188SA/WH | —

MOUNTING

			EPA ALT60	ALT96	ALT120
	1SA	1 Arm Side Mt.	0.58	0.64	0.72
	2SB	2 Arm Side Mt.	1.17	1.28	1.44
	2SL	2 Arm Side Mt.	0.91	0.97	1.05
	3ST	3 Arm Side Mt.	1.50	1.61	1.77
	3SY*	3 Arm Side Mt.	1.50	1.61	1.77
	4SC	4 Arm Side Mt.	1.66	1.78	1.93
	1W	Single Wall Mt.	n/a	n/a	n/a

*Available on round poles only
NOTE: EPA is for Fixture only

ELECTRICAL MODULE

Source		Color Temperature[1]		Voltages	
60L	60 LEDs	580nm	Amber	120	120V
96L	96 LEDs	4K	4000K	208	208V
120L	120 LEDs	5K	5000K	240	240V
				277	277V
				347	347V
				480	480V[2]

580nm = Amber, turtle friendly
4K = 4000 Kelvin LED
5K = 5000 Kelvin LED

FIXTURE

350 Milliamp	700 Milliamp
ALT1P35 Type I	**ALT1P70** Type I
ALT2P35 Type II	**ALT2P70** Type II
ALT3P35 Type III	**ALT3P70** Type III
ALT4P35 Type IV	**ALT4P70** Type IV
ALT5P35 Type V	**ALT5P70** Type V
ALTRP35 Type R, Right	**ALTRP70** Type R, Right
ALTLP35 Type L, Left	**ALTLP70** Type L, Left

FIXTURE FINISH

SG	Stealth Gray
BL	Black
DB	Dark Bronze
LG	Light Gray
PS	Platinum Silver
WH	White
CC	Custom Color*

*Consult representative

FIXTURE OPTIONS

1SW	Wall Mounting
SF	120 Volt Single Fuse
DF	208 Volt Double Fuse
DF	240 Volt Double Fuse
SF	277 Volt Single Fuse
SF	347 Volt Single Fuse
DF	480 Volt Double Fuse
A26	Photocell Receptacle
FGL	Flat Glass Lens
FPL	Flat Polycarbonate Lens[3]
NFO	Type III or IV Neighbor Friendly Optic
WIH-IM	In-Fixture wireless control module, PSG8 pg. 381.

POLE

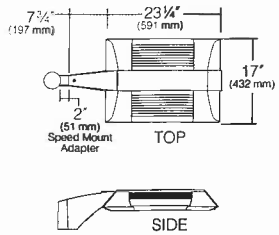
See p. **768-770** for pole ordering no. and EPA.

SLIPFITTER MOUNTING OPTIONS

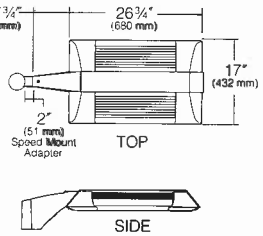
HORIZONTAL	
HSF	Horizontal Slipfitter Mount
VERTICAL	
4" Round, Standard Fixtures	
VSF-1SA	1 fixture side mt.
VSF-2SB	2 fixtures side mt. 180°
VSF-2SL	2 fixtures side mt. 90°
VSF-3ST	3 fixtures side mt. 90°
VSF-3SY	3 fixtures side mt. 120°[5]
VSF-4SC	4 fixtures side mt. 90°
4" Square, Standard Fixtures	
SVSF-1SA	1 fixture side mt.
SVSF-2SB	2 fixtures side mt. 180°
SVSF-2SL	2 fixtures side mt. 90°
SVSF-3ST	3 fixtures side mt. 90°
SVSF-4SC	4 fixtures side mt. 90°

[1] For custom optics and color temperature configurations, contact factory.
[2] 347V & 480V may include step-down transformer.
[3] Use only when vandalism is anticipated to be high. Required only for vandal protection in locations where fixtures can be reached by unauthorized persons.

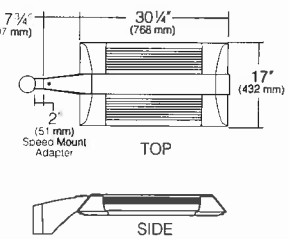
ALT60
Approx. Wt. = 27 lbs.



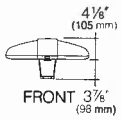
ALT96
Approx. Wt. = 30 lbs.



ALT120
Approx. Wt. = 34 lbs.



ALT60/ALT96/ALT120



KIM LIGHTING

ALTITUDE™

ALT180, ALT240, ALT300 Large LED Luminaire

12' and 20' poles in combination for these fixture types.

SITE / ROADWAY

FEATURES

- The ultimate in LED luminaire design featuring innovative engineering, thermal management and unique patent pending PicoPrism™ optics
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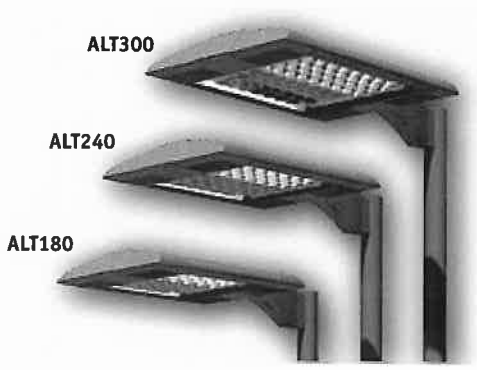
WiHUBB ENABLED



ORDERING INFORMATION (Example)

1SA	ALT3P35	180L5K277	WH	SF/A26	PRA20-4188SA/WH	—

MOUNTING

			EPA ALT180	ALT240	ALT300
	1SA	1 Arm Side Mt.	0.92	1.01	1.14
	2SB	2 Arm Side Mt.	1.84	2.01	2.28
	2SL	2 Arm Side Mt.	1.47	1.55	1.68
	3ST	3 Arm Side Mt.	2.38	2.56	2.82
	3SY*	3 Arm Side Mt.	2.38	2.56	2.82
	4SC	4 Arm Side Mt.	2.66	2.83	3.10
	1W	Single Wall Mt.	n/a	n/a	n/a

*Available on round poles only
NOTE: EPA is for Fixture only

ELECTRICAL MODULE

Source		Color Temperature[1]		Voltages	
180L	180 LEDs	580nm	Amber	120	120V
240L	240 LEDs	4K	4000K	208	208V
300L	300 LEDs	5K	5000K	240	240V
				277	277V
				347	347V
				480	480V[2]

580nm = Amber, turtle friendly
4K = 4000 Kelvin LED
5K = 5000 Kelvin LED

FIXTURE

350 Milliamp	700 Milliamp
ALT1P35 Type I	**ALT1P70** Type I
ALT2P35 Type II	**ALT2P70** Type II
ALT3P35 Type III	**ALT3P70** Type III
ALT4P35 Type IV	**ALT4P70** Type IV
ALT5P35 Type V	**ALT5P70** Type V
ALTRP35 Type R, Right	**ALTRP70** Type R, Right
ALTLP35 Type L, Left	**ALTLP70** Type L, Left

FIXTURE FINISH

SG	Stealth Gray
BL	Black
DB	Dark Bronze
LG	Light Gray
PS	Platinum Silver
WH	White
CC	Custom Color*

*Consult representative

FIXTURE OPTIONS

1SW	Wall Mounting
SF	120 Volt Single Fuse
DF	208 Volt Double Fuse
DF	240 Volt Double Fuse
SF	277 Volt Single Fuse
SF	347 Volt Single Fuse
DF	480 Volt Double Fuse
A26	Photocell Receptacle
FGL	Flat Glass Lens
FPL	Flat Polycarbonate Lens[3]
NFO	Type III or IV Neighbor Friendly Optic
WIH-IM	In-Fixture wireless control module, PSG8 pg. 381.

POLE

See p. **768-770** for pole ordering no. and EPA.

SLIPFITTER MOUNTING OPTIONS

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HSF	Horizontal Slipfitter Mount
VERTICAL	
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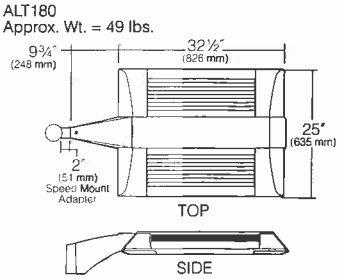
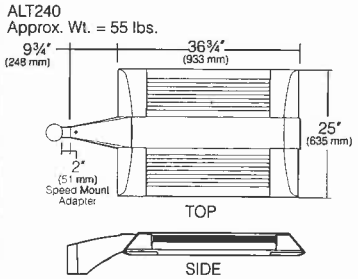
VSF-2SB	2 fixtures side mt. 180°
VSF-2SL	2 fixtures side mt. 90°
VSF-3ST	3 fixtures side mt. 90°
VSF-3SY	3 fixtures side mt. 120°[5]
VSF-4SC	4 fixtures side mt. 90°
4" Square, Standard Fixtures	
SVSF-1SA	1 fixture side mt.
SVSF-2SB	2 fixtures side mt. 180°
SVSF-2SL	2 fixtures side mt. 90°
SVSF-3ST	3 fixtures side mt. 90°
SVSF-4SC	4 fixtures side mt. 90°

[1] For custom optics and color temperature configurations, contact factory.
[2] 347V & may include step-down transformer.
[3] Use only when vandalism is anticipated to be high. Required only for vandal protection in locations where fixtures can be reached by unauthorized persons.

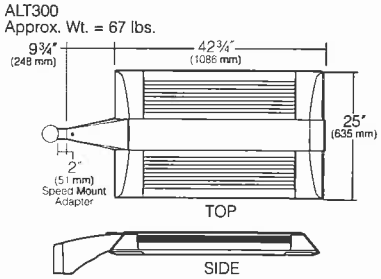
ALT180
Approx. Wt. = 49 lbs.



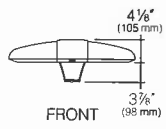
ALT240
Approx. Wt. = 55 lbs.



ALT300
Approx. Wt. = 67 lbs.

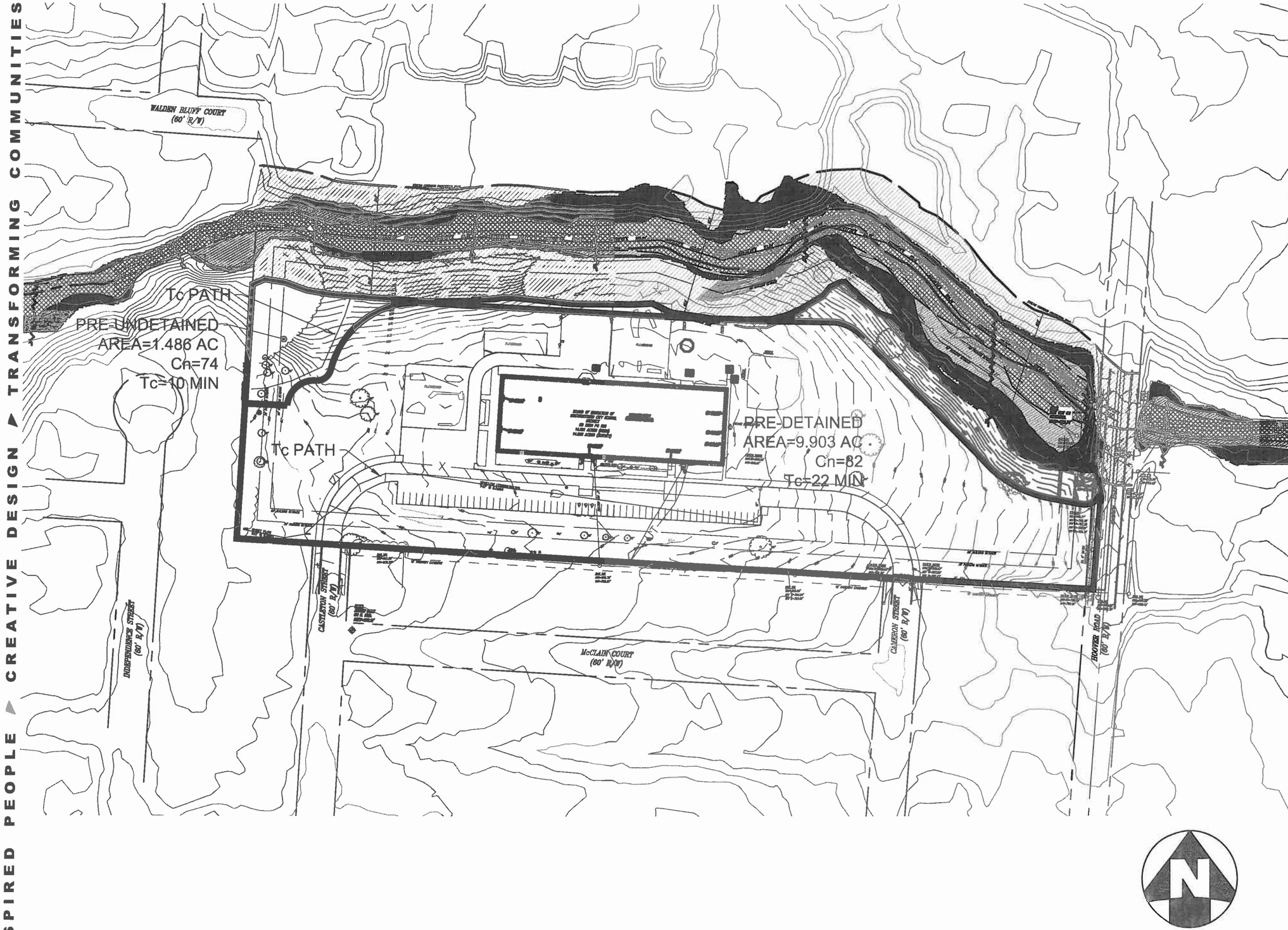


ALT180/ALT240/ALT300



KIM LIGHTING

INSPIRED PEOPLE ▶ CREATIVE DESIGN ▶ TRANSFORMING COMMUNITIES



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Westerville, OH 43082
614.882.4311

HIGHLAND PARK ELEMENTARY SCHOOL
2600 CAMERON STREET
GROVE CITY, OHIO

SEAL:

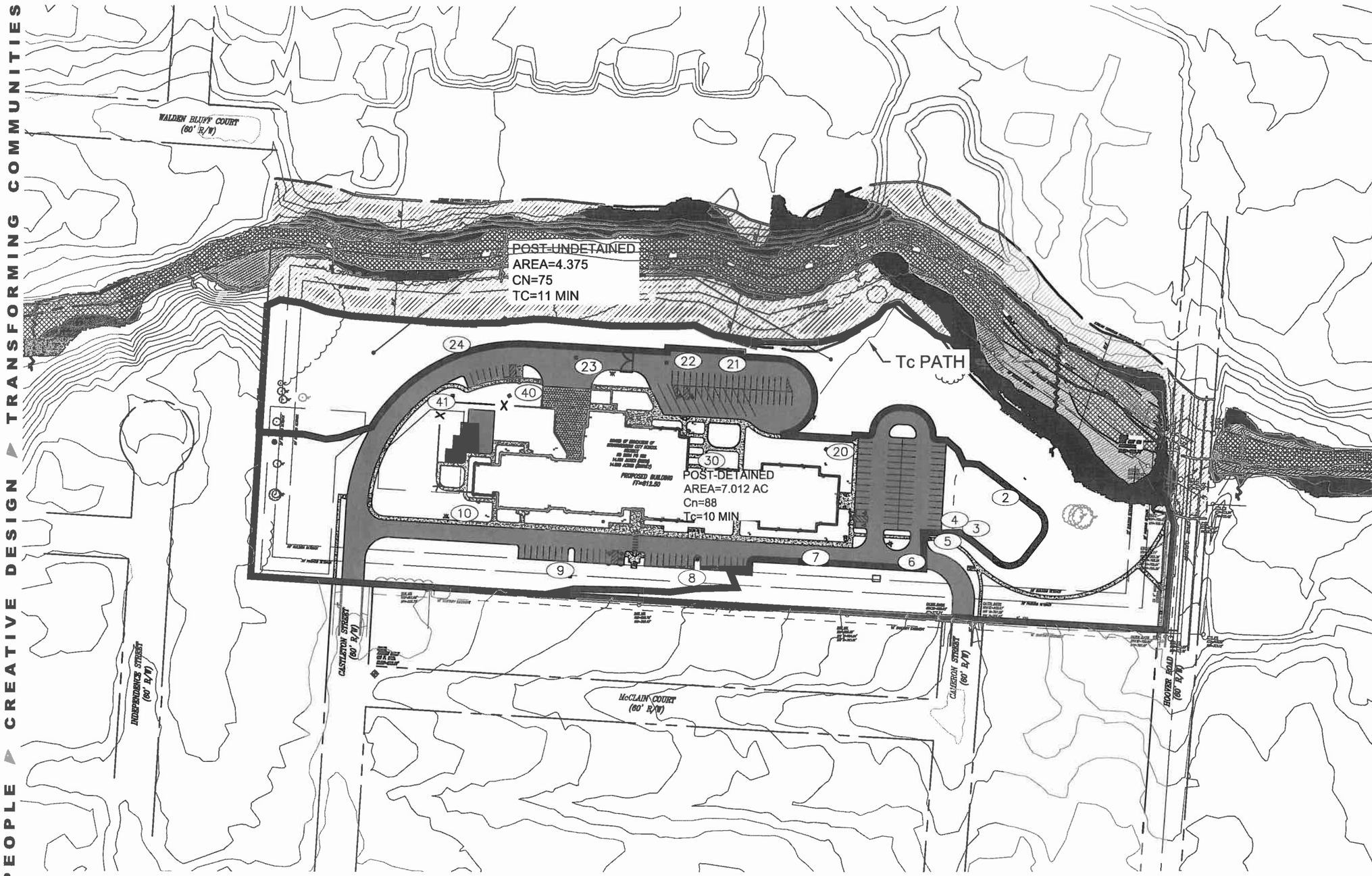
NO.	DATE	DESCRIPTION

PROJECT NO: **120161.00**
DATE: **07-23-2014**
SCALE:
0 75 150 300

SHEET NAME:
PRE-DEVELOPED DRAINAGE MAP

SHEET NO.
1

I:\Columbus\P\120161\DWG\000\SHEETS\120161DRN000.dwg, 7/22/2014 12:01:08 PM, mcouvreur



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HIGHLAND PARK ELEMENTARY SCHOOL

2600 CAMERON STREET
GROVE CITY, OHIO

SEAL:

NO.	DATE	DESCRIPTION

PROJECT NO: 120161.00

DATE: 07-23-2014

SCALE: 0 75 150 300

SHEET NAME: POST-DEVELOPED DRAINAGE MAP

SHEET NO. 2

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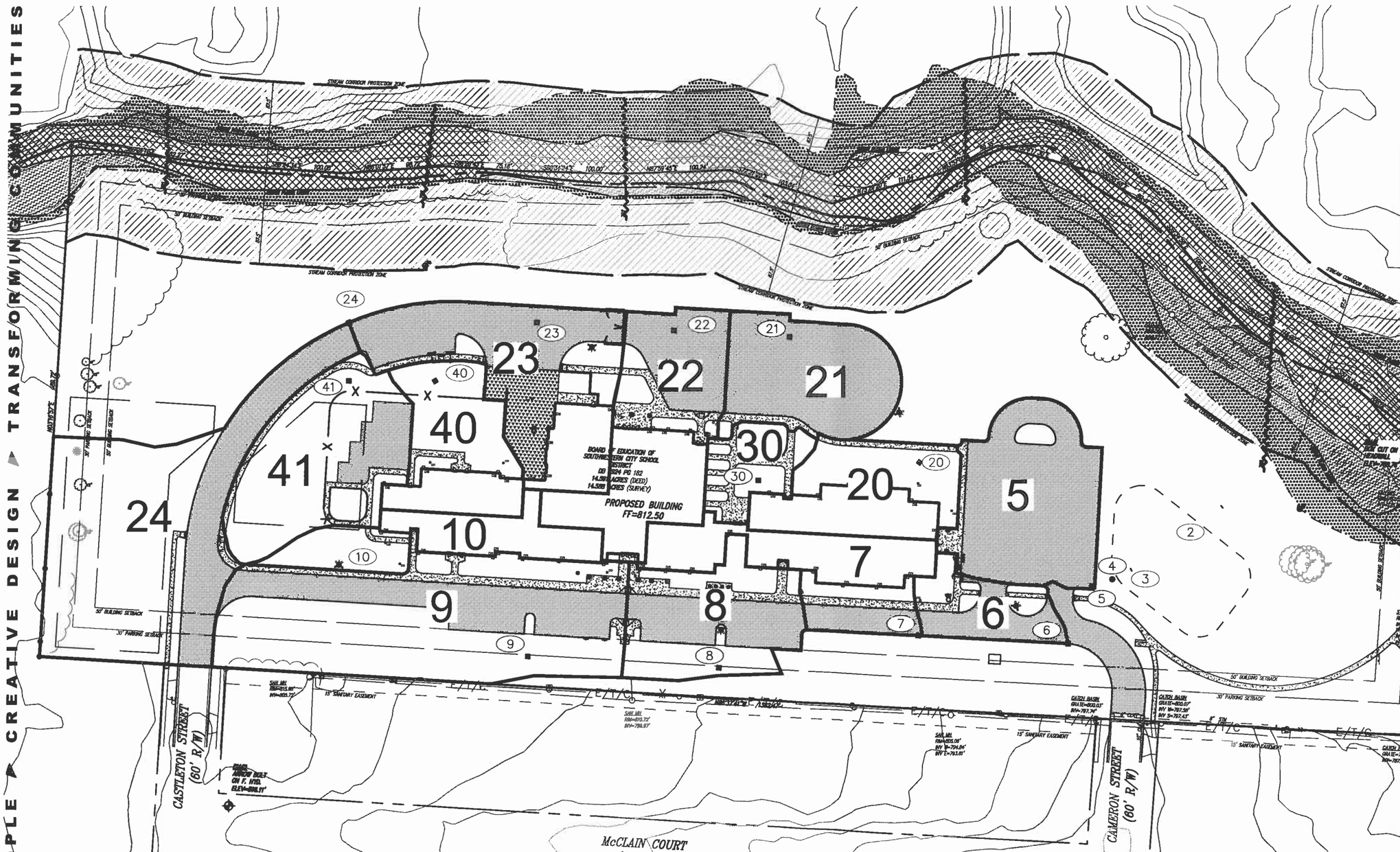

INLET #	AREA (ac)	C	Tc (min)
5	0.50	0.93	10
6	0.19	0.78	10
7	0.38	0.89	10
8	0.40	0.70	10
9	0.98	0.61	10
10	0.29	0.74	10
20	0.36	0.69	10

INLET #	AREA (ac)	C	Tc (min)
21	0.40	0.94	10
22	0.55	0.90	10
23	0.62	0.90	10
24	0.96	0.57	10
30	0.16	0.58	10
40	0.34	0.61	10
41	0.53	0.51	10

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HIGHLAND PARK ELEMENTARY SCHOOL

2600 CAMERON STREET
GROVE CITY, OHIO

SEAL:

NO.	DATE	DESCRIPTION

PROJECT NO: 120161.00

DATE: 07-23-2014

SCALE: 0 50 100 200

SHEET NAME: LOCAL DRAINAGE MAP

SHEET NO. 3

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Westerville, OH 43082
614.882.4311

STORM SEWER COMPUTATIONS

7/22/2014
i = Franklin County Stormwater Drainage Manual IDF

Project: Highland Park Elementary
Project Number: 120161.000

Design Storm: 5 yr
Check Storm: 10 yr
Manning's n: 0.013

LOCATION			BASIN DATA									PIPE DATA							HGL CHECK							
Inlet	Station	Outlet	ΔA (ac)	ΣA (ac)	ΔT_c (min)	ΣT_c (min)	Design i (in/hr)	Coeff. C	ΔCA (ac)	ΣCA (ac)	Design Discharge (cfs)	Pipe Size (in)	Pipe Length (ft)	Pipe Slope (ft/ft)	US Invert (ft)	DS Invert (ft)	Mean Velocity (ft/sec)	Pipe Full Capacity (cfs)	Check i (in/hr)	Check Discharge (cfs)	Mean Velocity (ft/sec)	Friction Slope (ft/ft)	Head Loss (ft)	TW Elevation (ft)	HW Elevation (ft)	Grate Elevation (ft)
41		40	0.53	0.53	10	10	4.80	0.51	0.27	0.27	1.30	12	84	0.0050	806.60	806.18	3.22	2.53	5.20	1.41	3.22	0.0050	0.42	807.47	807.89	809.59
40		23	0.34	0.87	10	10	4.80	0.61	0.21	0.48	2.29	12	113	0.0050	806.18	805.62	3.22	2.53	5.20	2.48	3.22	0.0050	0.56	806.91	807.47	810.70
24		23	0.96	0.96	10	10	4.80	0.57	0.54	0.54	2.61	15	182	0.0035	806.01	805.37	3.12	3.83	5.20	2.83	3.12	0.0035	0.64	806.91	807.55	811.22
23		22	0.62	2.45	10	10	4.80	0.90	0.55	1.58	7.57	24	132	0.0020	804.62	804.36	3.23	10.14	5.20	8.20	3.23	0.0020	0.26	806.65	806.91	809.45
22		21	0.55	3.00	10	10	4.80	0.90	0.50	2.07	9.94	24	112	0.0020	804.36	804.14	3.23	10.14	5.20	10.77	3.43	0.0023	0.25	806.39	806.65	809.72
21		20	0.40	3.40	10	10	4.80	0.94	0.38	2.45	11.75	30	174	0.0013	803.64	803.41	3.02	14.83	5.20	12.73	3.02	0.0013	0.23	806.17	806.39	809.72
30		20	0.16	0.16	10	10	4.80	0.58	0.09	0.09	0.45	12	157	0.0050	805.70	804.91	3.22	2.53	5.20	0.49	3.22	0.0050	0.79	806.17	806.95	811.27
20		5	0.36	3.92	10	10	4.80	0.69	0.25	2.79	13.40	30	207	0.0013	803.41	803.14	3.02	14.83	5.20	14.52	3.02	0.0013	0.27	805.90	806.17	810.78
10		9	0.29	0.29	10	10	4.80	0.74	0.22	0.22	1.03	12	180	0.0044	806.47	805.68	3.02	2.37	5.20	1.12	3.02	0.0044	0.79	806.94	807.73	810.34
9		8	0.98	1.27	10	10	4.80	0.61	0.60	0.81	3.91	24	184	0.0018	804.68	804.35	3.06	9.62	5.20	4.23	3.06	0.0018	0.33	806.61	806.94	808.20
8		7	0.40	1.67	10	10	4.80	0.70	0.28	1.09	5.25	24	195	0.0018	804.35	804.00	3.06	9.62	5.20	5.68	3.06	0.0018	0.35	806.26	806.61	808.20
7		6	0.38	2.05	10	10	4.80	0.89	0.34	1.43	6.87	24	144	0.0018	804.00	803.74	3.06	9.62	5.20	7.45	3.06	0.0018	0.26	806.00	806.26	810.07
6		5	0.19	2.24	10	10	4.80	0.78	0.15	1.58	7.58	24	58	0.0018	803.74	803.64	3.06	9.62	5.20	8.21	3.06	0.0018	0.10	805.90	806.00	806.94
5		4	0.50	6.66	10	10	4.80	0.93	0.47	4.84	23.22	30	20	0.0035	803.14	803.07	4.96	24.33	5.20	25.16	5.12	0.0037	0.07	805.82	805.90	808.12
4		3	0.00	6.66	10	10	4.80	0.00	0.00	4.84	23.22	30	20	0.0035	803.07	803.00	4.96	24.33	5.20	25.16	5.12	0.0037	0.07	805.75	805.82	807.62

Designed:MSM
Checked:MJC

THE KLEINGERS GROUP

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Westerville, OH 43082
phone 614.882.4311
fax 614.882.4479
www.kleingers.com

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JUL 23 2014
GC PLANNING COMMISSION

STORMWATER DETENTION CALCULATIONS
For the
City of Grove City

Highland Park Elementary School
2600 Cameron Street

STATE OF OHIO
MICHAEL J COUVREUR
E-70851
REGISTERED PROFESSIONAL ENGINEER
7/23/14

July 23, 2014

City of Grove City, Ohio

THE KLEINGERS GROUP

Highland Park Elementary School
Summary of Stormwater Detention Calculations

The stormwater detention calculations contained in this report were performed by using the SCS Unit Hydrograph hydrologic method in the Haestad Methods' PondPack, Version 10.1 software.

Detention Strategy

The proposed project will construct a new 69,639 SF elementary school building on the site of the existing Highland Park Elementary School located at 2600 Cameron Street. The current site generally drains from south to north to Marsh Run. The existing school building on the site is proposed to be demolished. One detention basin is proposed for the site and will handle water quality requirements.

The calculations and supporting information for the detention system are as follows, continuing with output data. Hydrographs were generated as follows:

- Pre-developed condition hydrographs were generated for the "Pre-developed" site tributary areas for storm frequencies of 1, 2, 5, 10, 25, 50, and 100-year storms. Please refer to the drainage map at the back of this report for a delineation of the drainage areas.
- Post-developed condition hydrographs were generated for the "Post Developed" site tributary areas for storm frequencies of 1, 2, 5, 10, 25, 50, and 100-year storms. Please refer to the drainage map at the back of this report for a delineation of the drainage areas.

Calculations for the pre-developed and post-developed flow rates and stormwater detention for each drainage area can be found in Appendix A.

Pre-Developed Condition

The following is the pre-developed data used to produce the runoff hydrograph for the area:

Pre-Detained	CN=82 (pg. 4.03)	T_c = 0.3748 hrs (pg. 3.05)	Area = 9.903 Ac
Pre-Undetained	CN=74 (pg. 4.04)	Tc = 0.1716 hrs (pg. 3.06)	Area = 1.486 Ac

The pre-developed conditions, though all tributary to Marsh Run, were modeled with two subareas in order to insure that post developed undetained run off is not greater than pre-developed run off.

The runoff hydrographs for the "Pre-Developed" areas were calculated and peak flow rates for each storm frequency are:

Pre-Detained:

Q_1= 7.49 cfs (pg. 5.15)
Q_2= 10.64 cfs (pg. 5.16)
Q_5= 15.47 cfs (pg. 5.17)
Q_{10}= 19.64 cfs (pg. 5.18)
Q_{25}= 25.64 cfs (pg. 5.19)
Q_{50}= 30.71 cfs (pg. 5.20)
Q_{100}= 36.09 cfs (pg. 5.21)

Pre-Undetained:

Q_1= 0.80 cfs (pg. 5.22)
Q_2= 1.30 cfs (pg. 5.23)
Q_5= 2.10 cfs (pg. 5.24)
Q_{10}= 2.81 cfs (pg. 5.25)
Q_{25}= 3.87 cfs (pg. 5.26)
Q_{50}= 4.80 cfs (pg. 5.27)
Q_{100}= 5.81 cfs (pg. 5.28)

THE KLEINGERS GROUP

Post Developed Condition

The following is the post developed data used to produce the runoff hydrographs for the area:

Post-Detained	CN=88 (pg. 4.01)	T_C = 0.1667 hrs (pg. 3.01)	Area = 7.012 Ac
Post-Undetained	CN=75 (pg. 4.02)	T_C = 0.1853 hrs (pg. 3.03)	Area = 4.375 Ac

The runoff hydrographs for the "Post Developed" areas were calculated and peak flow rates for each storm frequency are:

Post-Detained:

Q_1= 10.85 cfs (pg. 5.01)
Q_2= 14.30 cfs (pg. 5.02)
Q_5= 19.34 cfs (pg. 5.03)
Q_{10}= 23.53 cfs (pg. 5.04)
Q_{25}= 29.43 cfs (pg. 5.05)
Q_{50}= 34.31 cfs (pg. 5.06)
Q_{100}= 39.44 cfs (pg. 5.07)

Post-Undetained:

Q_1= 2.55 cfs (pg. 5.08)
Q_2= 4.05 cfs (pg. 5.09)
Q_5= 6.41 cfs (pg. 5.10)
Q_{10}= 8.52 cfs (pg. 5.11)
Q_{25}= 11.67 cfs (pg. 5.12)
Q_{50}= 14.38 cfs (pg. 5.13)
Q_{100}= 17.31 cfs (pg. 5.14)

Stormwater Runoff Control Criteria

The City of Grove City requires projects to adhere to the stormwater management requirements provided in the Grove City Subdivision Regulations. These regulations stipulate a critical year storm design method. This method is used to determine the allowable release rates from the analysis areas. The critical storm method states that the percent increase in runoff volume for a one year frequency, 24-hour storm determines the critical storm event. The post-developed runoff must be controlled for storms of a frequency between one year and the critical storm so that the rate of runoff does not exceed the peak rate of runoff for a pre-developed 24-hour, one year frequency storm. All storm events greater than the critical year must be controlled such that the post-developed runoff rate does not exceed the pre-developed runoff rate for the same given storm event frequency.

The 1 year pre-developed hydrological volume for the site is 0.702 acre-feet (pg. 1.04). The 1 year post-developed hydrological volume for the site is 0.836 acre-feet (pg. 1.02). The difference between the two hydrological volumes represents an increase in stormwater runoff of 19%. Referencing the Grove City Subdivision Regulations, this percentage signifies that the project must adhere to the 2 year critical year storm event.

The post developed case for this site was separated into two sub-areas. One area, labeled as "Post Detained", which includes site area tributary to the proposed extended detention basin. The other area, labeled as "Post Undetained", includes site areas not tributary to the proposed extended detention basin. The combined outflow of the "Post-Detained" and "Post-Undetained" resulted in the "Post-Out" flows. These resulting flows were held to the required peak flow release rates determined by the "Pre-developed" storm events.

THE KLEINGERS GROUP

Stream Corridor Protection Zone

Marsh Run meanders along the northern portion of the site. The Grove City Natural Stream Protection Policy requires a riparian setback for all natural open watercourses. The setback is established by the equation:

SW=129*(DA)^0.43

Where: SW=setback width measured in feet, centered on the watercourse
DA=Drainage area in square miles (minimum SW=25 feet)

The USGS Streamstats website (http://water.usgs.gov/osw/streamstats/ohio.html) was utilized to define the tributary area to Marsh Run near the northeast corner of the site. The tributary area was reported as 2.02 square miles, resulting in a setback width of 175 feet centered on the watercourse.

Water Quality

The Ohio Environmental Protection Agency (OEPA) requires projects to capture and treat stormwater for a storm event of 0.75" or less.

The required water quality volume is calculated by the equation:

$$WQ_v = \frac{CPA}{12}$$

Where WQ_v = water quality volume in acre-feet
C = runoff coefficient, $0.858i^3-0.78i^2+0.774i+0.04$, i = fraction of post-construction impervious surface
P = 0.75 in precipitation depth
A = area draining into the BMP in acres

As permitted by the OEPA, 20% of the calculated WQv storage will be provided for the redevelopment area and 100% of the calculated WQv storage will be provided for the new development area.
New development area is calculated as the difference between the post developed impervious area (4.041 acres) and the pre-developed impervious area (2.971 acres).

$$WQ_v = \frac{(0.89)(0.75)(1.07)}{12} = 0.059\ acre - feet$$

The redevelopment area is the remaining portion of the site (11.387 acres –1.07 acres = 10.317 acres)

$$WQ_v = \frac{(0.22)(0.75)(10.317)}{12} = 0.142\ acre - feet$$
$$WQ_v = 20\%\ of\ 0.142\ acre - feet = 0.028\ acre - feet$$

The required WQv storage for the site is 0.087 acre-feet (0.059 acre-feet + 0.028 acre-feet).

Area tributary to the detention basin ("Post-Detained") will be treated for water quality.

$$WQ_v = \frac{(0.38)(0.75)(7.012)}{12} = 0.166 acre - feet$$

The proposed WQv storage is more than double the required WQv storage, and thus should satisfy the OEPA General Permit.

Additionally, the resultant WQv should be increased 20% for sediment storage and reduced infiltration capacity. This results in a final required WQv of 0.199 acre-feet.

Water quality capture and treatment for this site will occur in proposed extended detention basin. A 1.125" diameter orifice, invert elevation=801.50, has been designed to provide the drawdown time required. The orifice provides a 100% drawdown time of approximately 62.92 hours. Refer to the drawdown calculations and graph in the appendix of this report.

In lieu of constructing a forebay and micropool within the proposed extended detention basin for pretreatment, a hydrodynamic separator will be used to prevent sediment from entering the basin. The hydrodynamic separator has been sized based on the amount of flow to be treated:

$$Q = CiA$$

Where Q = flow in cubic feet per second
C = runoff coefficient, $0.858i^3-0.78i^2+0.774i+0.04$, i = fraction of post-construction impervious surface
i = rainfall intensity in inches per hour (taken from Franklin County Stormwater Drainage Manual IDF curve)
A = area tributary to the hydrodynamic separator, in acres

$$Q = (0.38)(1.6)(7.012) = 4.26 \text{ cubic feet per second}$$

A Contech CDS4030 structure or approved equal has been incorporated into the design for this site. This water quality structure has been sized accordingly to be able to handle the amount of flow required.

Outlet Structure

The proposed outfall structure for the extended detention basin (catch basin 2) will be placed on the east side of the extended detention basin. The outlet will consist of a horizontal perforated reverse flow pipe with a 1.125" orifice at invert elevation 801.50 cut into the side of the 6" pipe inside the catch basin to allow for water quality requirement. Three windows will be installed to meet the detention flow requirements. One 24"x5" windows (invert = 803.55) will be cut in the south face of the structure. Two 24"x9" windows (invert = 805.10) will be installed on the west and east faces of the structure. The 100-yr water surface elevation for the extended detention basin is 806.71. The grate of the outlet structure is 806.75.

Storm Routing

The post-developed storm was routed through the detention system using PondPack 10.1 software. The following are the peak flow rates out of the detention system with the corresponding water surface elevation in the basin for each storm frequency:

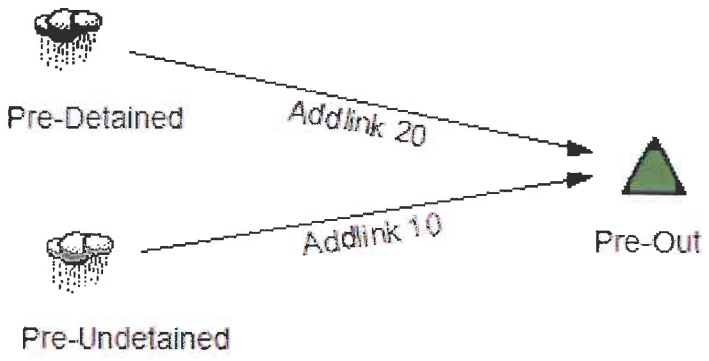
P-Detention:

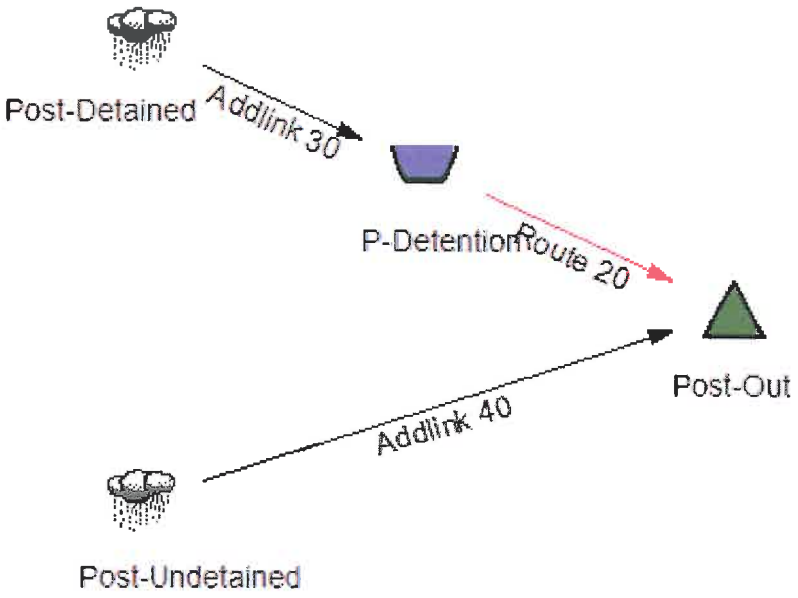
1-yr storm: Q_1= 2.86 cfs @ 804.25 (pg. 8.01)
2-yr storm: Q_2= 3.97 cfs @ 804.72 (pg. 8.02)
5-yr storm: Q_5= 10.30 cfs @ 805.13 (pg. 8.03)
10-yr storm: Q_{10}= 13.83 cfs @ 805.42 (pg. 8.04)
25-yr storm: Q_{25}= 17.05 cfs @ 805.83 (pg. 8.05)
50-yr storm: Q_{50}= 17.97 cfs @ 806.20 (pg. 8.06)
100-yr storm: Q_{100}= 18.90 cfs @ 806.59 (pg.8.07)

Detention Summary

Per Grove City Subdivision Regulations, the post-developed flows from the development area are less than those determined by the critical storm. The resulting flow at the watershed outlet, is as follows:

PRE-DEVELOPED RELEASE RATES	POST-DEVELOPED ("Post-Out") RELEASE RATES
Q_1=8.04 cfs *	Q_1= 4.72 cfs
Q_2= 11.61 cfs	**Q_2= 7.33 cfs ***
Q_5= 17.08 cfs	Q_5= 15.25 cfs
Q_{10}= 21.78 cfs	Q_{10}= 21.11 cfs
Q_{25}= 28.57 cfs	Q_{25}= 27.80 cfs
Q_{50}= 34.32 cfs	Q_{50}= 31.57 cfs
Q_{100}= 40.44 cfs	Q_{100}= 35.20 cfs


Pre-Detained
Addlink 20
Addlink 10
Pre-Out
Pre-Undetained


Post-Detained
Addlink 30
P-Detention
Route 20
Post-Out
Addlink 40
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MASTER DESIGN STORM SUMMARY

Network Storm Collection: CITY OF COLUMBUS

Return Event	Total Depth in	Rainfall Type	RNF ID
1	2.2000	Synthetic Curve	TypeII 24hr
2	2.6300	Synthetic Curve	TypeII 24hr
5	3.2400	Synthetic Curve	TypeII 24hr
10	3.7400	Synthetic Curve	TypeII 24hr
25	4.4400	Synthetic Curve	TypeII 24hr
50	5.0200	Synthetic Curve	TypeII 24hr
100	5.6300	Synthetic Curve	TypeII 24hr

MASTER NETWORK SUMMARY
SCS Unit Hydrograph Method

(*Node=Outfall; +Node=Diversion;)
(Trun= HYG Truncation: Blank=None; L=Left; R=Rt; LR=Left&Rt)

Node ID	Type	Return Event	HYG Vol ac-ft	Trun	Qpeak hrs	Qpeak cfs	Max WSEL ft	Max Pond Storage ac-ft
P-DETENTION IN	POND	1	.660		12.0000	10.85		
P-DETENTION IN	POND	2	.873		12.0000	14.30		
P-DETENTION IN	POND	5	1.188		11.9800	19.34		
P-DETENTION IN	POND	10	1.454		11.9800	23.53		
P-DETENTION IN	POND	25	1.835		11.9800	29.43		
P-DETENTION IN	POND	50	2.155		11.9800	34.31		
P-DETENTION IN	POND	100	2.495		11.9800	39.44		
P-DETENTION OUT	POND	1	.659		12.2100	2.86	804.25	.279
P-DETENTION OUT	POND	2	.873		12.2000	3.97	804.72	.369
P-DETENTION OUT	POND	5	1.188		12.1300	10.30	805.13	.453
P-DETENTION OUT	POND	10	1.454		12.1100	13.83	805.42	.518
P-DETENTION OUT	POND	25	1.835		12.1100	17.05	805.83	.613
P-DETENTION OUT	POND	50	2.155		12.1200	17.97	806.20	.703
P-DETENTION OUT	POND	100	2.495		12.1300	18.90	806.59	.805

MASTER NETWORK SUMMARY
SCS Unit Hydrograph Method

(*Node=Outfall; +Node=Diversion;)
(Trun= HYG Truncation: Blank=None; L=Left; R=Rt; LR=Left&Rt)

Node ID	Type	Return Event	HYG Vol ac-ft	Trun	Qpeak hrs	Qpeak cfs	Max WSEL ft	Max Pond Storage ac-ft
POST-DETAINED	AREA	1	.660		12.0000	10.85		
POST-DETAINED	AREA	2	.873		12.0000	14.30		
POST-DETAINED	AREA	5	1.188		11.9800	19.34		
POST-DETAINED	AREA	10	1.454		11.9800	23.53		
POST-DETAINED	AREA	25	1.835		11.9800	29.43		
POST-DETAINED	AREA	50	2.155		11.9800	34.31		
POST-DETAINED	AREA	100	2.495		11.9800	39.44		
*POST-OUT	JCT	1	.836		12.0800	4.72		
*POST-OUT	JCT	2	1.138		12.0600	7.33		
*POST-OUT	JCT	5	1.597		12.0800	15.25		
*POST-OUT	JCT	10	1.992		12.0600	21.11		
*POST-OUT	JCT	25	2.565		12.0500	27.80		
*POST-OUT	JCT	50	3.054		12.0300	31.57		
*POST-OUT	JCT	100	3.578		12.0300	35.20		
POST-UNDETAINED	AREA	1	.176		12.0300	2.55		
POST-UNDETAINED	AREA	2	.265		12.0300	4.05		
POST-UNDETAINED	AREA	5	.409		12.0300	6.41		
POST-UNDETAINED	AREA	10	.537		12.0100	8.52		
POST-UNDETAINED	AREA	25	.730		12.0100	11.67		
POST-UNDETAINED	AREA	50	.899		12.0100	14.38		
POST-UNDETAINED	AREA	100	1.083		12.0100	17.31		
PRE-DETAINED	AREA	1	.647		12.1400	7.49		
PRE-DETAINED	AREA	2	.903		12.1400	10.64		
PRE-DETAINED	AREA	5	1.296		12.1000	15.47		
PRE-DETAINED	AREA	10	1.636		12.1000	19.64		
PRE-DETAINED	AREA	25	2.132		12.1000	25.64		
PRE-DETAINED	AREA	50	2.556		12.1000	30.71		
PRE-DETAINED	AREA	100	3.011		12.1000	36.09		

MASTER NETWORK SUMMARY
SCS Unit Hydrograph Method

(*Node=Outfall; +Node=Diversion;)
(Trun= HYG Truncation: Blank=None; L=Left; R=Rt; LR=Left&Rt)

Node ID	Type	Return Event	HYG Vol ac-ft	Trun	Qpeak hrs	Qpeak cfs	Max WSEL ft	Max Pond Storage ac-ft
*PRE-OUT	JCT	1	.702		12.1000	8.04		
*PRE-OUT	JCT	2	.988		12.0900	11.61		
*PRE-OUT	JCT	5	1.428		12.0900	17.08		
*PRE-OUT	JCT	10	1.810		12.0900	21.78		
*PRE-OUT	JCT	25	2.371		12.0900	28.57		
*PRE-OUT	JCT	50	2.850		12.0900	34.32		
*PRE-OUT	JCT	100	3.367		12.0900	40.44		
PRE-UNDETAINED	AREA	1	.055		12.0300	.80		
PRE-UNDETAINED	AREA	2	.085		12.0200	1.30		
PRE-UNDETAINED	AREA	5	.132		12.0100	2.10		
PRE-UNDETAINED	AREA	10	.174		12.0100	2.81		
PRE-UNDETAINED	AREA	25	.239		12.0000	3.87		
PRE-UNDETAINED	AREA	50	.295		11.9900	4.80		
PRE-UNDETAINED	AREA	100	.356		11.9900	5.81		

Title... Project Date: 4/24/2013
Project Engineer: masonm
Project Title: Highland Park ES
Project Comments:

DESIGN STORMS SUMMARY

Design Storm File,ID = CITY OF COLUMBUS

Storm Tag Name = 1

Data Type, File, ID = Synthetic Storm TypeII 24hr
Storm Frequency = 1 yr
Total Rainfall Depth= 2.2000 in
Duration Multiplier = 1
Resulting Duration = 24.0000 hrs
Resulting Start Time= .0000 hrs Step= .1000 hrs End= 24.0000 hrs

Storm Tag Name = 2

Data Type, File, ID = Synthetic Storm TypeII 24hr
Storm Frequency = 2 yr
Total Rainfall Depth= 2.6300 in
Duration Multiplier = 1
Resulting Duration = 24.0000 hrs
Resulting Start Time= .0000 hrs Step= .1000 hrs End= 24.0000 hrs

Storm Tag Name = 5

Data Type, File, ID = Synthetic Storm TypeII 24hr
Storm Frequency = 5 yr
Total Rainfall Depth= 3.2400 in
Duration Multiplier = 1
Resulting Duration = 24.0000 hrs
Resulting Start Time= .0000 hrs Step= .1000 hrs End= 24.0000 hrs

Storm Tag Name = 10

Data Type, File, ID = Synthetic Storm TypeII 24hr
Storm Frequency = 10 yr
Total Rainfall Depth= 3.7400 in
Duration Multiplier = 1
Resulting Duration = 24.0000 hrs
Resulting Start Time= .0000 hrs Step= .1000 hrs End= 24.0000 hrs

Storm Tag Name = 25

Data Type, File, ID = Synthetic Storm TypeII 24hr
Storm Frequency = 25 yr
Total Rainfall Depth= 4.4400 in
Duration Multiplier = 1
Resulting Duration = 24.0000 hrs
Resulting Start Time= .0000 hrs Step= .1000 hrs End= 24.0000 hrs

Title... Project Date: 4/24/2013
Project Engineer: masonm
Project Title: Highland Park ES
Project Comments:

DESIGN STORMS SUMMARY

Design Storm File,ID = CITY OF COLUMBUS

Storm Tag Name = 50

Data Type, File, ID = Synthetic Storm TypeII 24hr
Storm Frequency = 50 yr
Total Rainfall Depth= 5.0200 in
Duration Multiplier = 1
Resulting Duration = 24.0000 hrs
Resulting Start Time= .0000 hrs Step= .1000 hrs End= 24.0000 hrs

Storm Tag Name = 100

Data Type, File, ID = Synthetic Storm TypeII 24hr
Storm Frequency = 100 yr
Total Rainfall Depth= 5.6300 in
Duration Multiplier = 1
Resulting Duration = 24.0000 hrs
Resulting Start Time= .0000 hrs Step= .1000 hrs End= 24.0000 hrs

::
TIME OF CONCENTRATION CALCULATOR
::

Segment #1: Tc: User Defined

Segment #1 Time: .1667 hrs

==========
Total Tc: .1667 hrs
==========

Tc Equations used...

==== User Defined ==========

Tc = Value entered by user

Where: Tc = Time of concentration

::
TIME OF CONCENTRATION CALCULATOR
::

Segment #1: Tc: TR-55 Sheet

Mannings n	.2400	
Hydraulic Length	100.00	ft
2yr, 24hr P	2.6300	in
Slope	.050000	ft/ft

Avg.Velocity .15 ft/sec

Segment #1 Time: .1818 hrs

Segment #2: Tc: TR-55 Shallow

Hydraulic Length	78.00	ft
Slope	.154000	ft/ft
Unpaved		

Avg.Velocity 6.33 ft/sec

Segment #2 Time: .0034 hrs

==========
Total Tc: .1853 hrs
==========

Tc Equations used...

==== SCS TR-55 Sheet Flow ==========

```
Tc = (.007 * ((n * Lf)**0.8)) / ((P**.5) * (Sf**.4))

Where:  Tc = Time of concentration, hrs
        n  = Mannings n
        Lf = Flow length, ft
        P  = 2yr, 24hr Rain depth, inches
        Sf = Slope, %
```

==== SCS TR-55 Shallow Concentrated Flow ==========

```
Unpaved surface:
V  = 16.1345 * (Sf**0.5)

Paved surface:
V  = 20.3282 * (Sf**0.5)

Tc = (Lf / V) / (3600sec/hr)

Where:  V  = Velocity, ft/sec
        Sf = Slope, ft/ft
        Tc = Time of concentration, hrs
        Lf = Flow length, ft
```

::
TIME OF CONCENTRATION CALCULATOR
::

Segment #1: Tc: TR-55 Sheet

Mannings n	.2400	
Hydraulic Length	100.00	ft
2yr, 24hr P	2.6300	in
Slope	.018700	ft/ft
Avg.Velocity	.10	ft/sec

Segment #1 Time: .2695 hrs

Segment #2: Tc: TR-55 Shallow

Hydraulic Length	747.00	ft
Slope	.009400	ft/ft
Paved		
Avg.Velocity	1.97	ft/sec

Segment #2 Time: .1053 hrs

==========
Total Tc: .3748 hrs
==========

Tc Equations used...

==== SCS TR-55 Sheet Flow ==========

```
Tc = (.007 * ((n * Lf)**0.8)) / ((P**.5) * (Sf**.4))

Where:  Tc = Time of concentration, hrs
        n  = Mannings n
        Lf = Flow length, ft
        P  = 2yr, 24hr Rain depth, inches
        Sf = Slope, %
```

==== SCS TR-55 Shallow Concentrated Flow ==========

```
Unpaved surface:
V  = 16.1345 * (Sf**0.5)

Paved surface:
V  = 20.3282 * (Sf**0.5)

Tc = (Lf / V) / (3600sec/hr)

Where:  V  = Velocity, ft/sec
        Sf = Slope, ft/ft
        Tc = Time of concentration, hrs
        Lf = Flow length, ft
```

::
TIME OF CONCENTRATION CALCULATOR
::

Segment #1: Tc: TR-55 Sheet

Mannings n	.2400	
Hydraulic Length	100.00	ft
2yr, 24hr P	2.6300	in
Slope	.065000	ft/ft
Avg.Velocity	.17	ft/sec

Segment #1 Time: .1637 hrs

Segment #2: Tc: TR-55 Shallow

Hydraulic Length	138.00	ft
Slope	.090600	ft/ft
Unpaved		
Avg.Velocity	4.86	ft/sec

Segment #2 Time: .0079 hrs

==========
Total Tc: .1716 hrs
==========

Tc Equations used...

==== SCS TR-55 Sheet Flow ==========

```
Tc = (.007 * ((n * Lf)**0.8)) / ((P**.5) * (Sf**.4))

Where:  Tc = Time of concentration, hrs
        n  = Mannings n
        Lf = Flow length, ft
        P  = 2yr, 24hr Rain depth, inches
        Sf = Slope, %
```

==== SCS TR-55 Shallow Concentrated Flow ==========

```
Unpaved surface:
V  = 16.1345 * (Sf**0.5)

Paved surface:
V  = 20.3282 * (Sf**0.5)

Tc = (Lf / V) / (3600sec/hr)

Where:  V  = Velocity, ft/sec
        Sf = Slope, ft/ft
        Tc = Time of concentration, hrs
        Lf = Flow length, ft
```

RUNOFF CURVE NUMBER DATA

::

Soil/Surface Description	CN	Area acres	Impervious Adjustment %C	Impervious Adjustment %UC	Adjusted CN
Open space (Lawns,parks etc.) - Goo	80	.861			80.00
Open space (Lawns,parks etc.) - Goo	74	2.210			74.00
Impervious Areas - Paved parking lo	98	3.941			98.00
COMPOSITE AREA & WEIGHTED CN --->		7.012			88.23 (88)

::

RUNOFF CURVE NUMBER DATA

Soil/Surface Description	CN	Area acres	Impervious Adjustment %C	Impervious Adjustment %UC	Adjusted CN
Impervious Areas - Paved parking lo	98	.100			98.00
Open space (Lawns,parks etc.) - Goo	74	4.275			74.00
COMPOSITE AREA & WEIGHTED CN --->		4.375			74.55 (75)

RUNOFF CURVE NUMBER DATA
::

Soil/Surface Description	CN	Area acres	Impervious Adjustment %C	%UC	Adjusted CN
Impervious Areas - Paved parking lo	98	2.949			98.00
Open space (Lawns,parks etc.) - Goo	80	.921			80.00
Open space (Lawns,parks etc.) - Goo	74	6.033			74.00
COMPOSITE AREA & WEIGHTED CN --->		9.903			81.70 (82)

::

RUNOFF CURVE NUMBER DATA

Soil/Surface Description	CN	Area acres	Impervious Adjustment %C	%UC	Adjusted CN
Impervious Areas - Paved parking lo	98	.022			98.00
Open space (Lawns,parks etc.) - Goo	74	1.464			74.00
COMPOSITE AREA & WEIGHTED CN --->		1.486			74.36 (74)

```
SCS UNIT HYDROGRAPH METHOD

STORM EVENT: 1 year storm
Duration      = 24.0000 hrs     Rain Depth = 2.2000 in
Rain Dir      = H:\Columbus\P\120161\Design\Storm Drainage\
Rain File -ID =  - TypeII  24hr
Unit Hyd Type = Default Curvilinear
HYG Dir       = H:\Columbus\P\120161\Design\Storm Drainage\
HYG File - ID =  - POST-DETAINED 1
Tc            = .1667 hrs
Drainage Area = 7.012 acres  Runoff CN= 88

============================================
Computational Time Increment   =   .02222 hrs
Computed Peak Time             =  12.0002 hrs
Computed Peak Flow             =    10.85 cfs

Time Increment for HYG File    =    .0100 hrs
Peak Time, Interpolated Output =  12.0002 hrs
Peak Flow, Interpolated Output =    10.85 cfs
============================================

                DRAINAGE AREA
              -------------------
              ID:POST-DETAINED
              CN   =   88
              Area =       7.012 acres
              S    =   1.3636 in
              0.2S =    .2727 in

               Cumulative Runoff
              -------------------
                      1.1287 in
                        .660 ac-ft

HYG Volume...           .660 ac-ft (area under HYG curve)

***** SCS UNIT HYDROGRAPH PARAMETERS *****

Time Concentration, Tc =   .16667 hrs (ID: POST-DETAINED)
Computational Incr, Tm =   .02222 hrs = 0.20000 Tp

Unit Hyd. Shape Factor =  483.432 (37.46% under rising limb)
K =  483.43/645.333,  K =    .7491 (also, K = 2/(1+(Tr/Tp))
Receding/Rising, Tr/Tp =   1.6698 (solved from K =   .7491)

Unit peak,          qp =    47.67 cfs
Unit peak time      Tp =   .11111 hrs
Unit receding limb, Tr =   .44445 hrs
Total unit time,    Tb =   .55557 hrs
```

```
SCS UNIT HYDROGRAPH METHOD

STORM EVENT: 2 year storm
Duration      = 24.0000 hrs     Rain Depth = 2.6300 in
Rain Dir      = H:\Columbus\P\120161\Design\Storm Drainage\
Rain File -ID =  - TypeII  24hr
Unit Hyd Type = Default Curvilinear
HYG Dir       = H:\Columbus\P\120161\Design\Storm Drainage\
HYG File - ID =  - POST-DETAINED 2
Tc            = .1667 hrs
Drainage Area = 7.012 acres  Runoff CN= 88

=============================================
Computational Time Increment   =   .02222 hrs
Computed Peak Time             =  12.0002 hrs
Computed Peak Flow             =    14.30 cfs

Time Increment for HYG File    =    .0100 hrs
Peak Time, Interpolated Output =  12.0002 hrs
Peak Flow, Interpolated Output =    14.30 cfs
=============================================

                DRAINAGE AREA
              -------------------
              ID:POST-DETAINED
              CN   =   88
              Area =       7.012 acres
              S    =   1.3636 in
              0.2S =    .2727 in

               Cumulative Runoff
              -------------------
                      1.4934 in
                        .873 ac-ft

HYG Volume...           .873 ac-ft (area under HYG curve)

***** SCS UNIT HYDROGRAPH PARAMETERS *****

Time Concentration, Tc =   .16667 hrs (ID: POST-DETAINED)
Computational Incr, Tm =   .02222 hrs = 0.20000 Tp

Unit Hyd. Shape Factor =  483.432 (37.46% under rising limb)
K =  483.43/645.333,  K =    .7491 (also, K = 2/(1+(Tr/Tp))
Receding/Rising, Tr/Tp =   1.6698 (solved from K =   .7491)

Unit peak,          qp =    47.67 cfs
Unit peak time      Tp =   .11111 hrs
Unit receding limb, Tr =   .44445 hrs
Total unit time,    Tb =   .55557 hrs
```

```
SCS UNIT HYDROGRAPH METHOD

STORM EVENT: 5 year storm
Duration      = 24.0000 hrs     Rain Depth = 3.2400 in
Rain Dir      = H:\Columbus\P\120161\Design\Storm Drainage\
Rain File -ID =  - TypeII  24hr
Unit Hyd Type = Default Curvilinear
HYG Dir       = H:\Columbus\P\120161\Design\Storm Drainage\
HYG File - ID =  - POST-DETAINED 5
Tc            = .1667 hrs
Drainage Area = 7.012 acres  Runoff CN= 88

============================================
Computational Time Increment   =   .02222 hrs
Computed Peak Time             =  11.9780 hrs
Computed Peak Flow             =    19.35 cfs

Time Increment for HYG File    =    .0100 hrs
Peak Time, Interpolated Output =  11.9802 hrs
Peak Flow, Interpolated Output =    19.34 cfs
============================================

                 DRAINAGE AREA
               -------------------
               ID:POST-DETAINED
               CN   =   88
               Area =       7.012 acres
               S    =   1.3636 in
               0.2S =    .2727 in

                Cumulative Runoff
               -------------------
                       2.0330 in
                        1.188 ac-ft

HYG Volume...           1.188 ac-ft (area under HYG curve)

***** SCS UNIT HYDROGRAPH PARAMETERS *****

Time Concentration, Tc =   .16667 hrs (ID: POST-DETAINED)
Computational Incr, Tm =   .02222 hrs = 0.20000 Tp

Unit Hyd. Shape Factor =  483.432 (37.46% under rising limb)
K =  483.43/645.333,  K =    .7491 (also, K = 2/(1+(Tr/Tp))
Receding/Rising, Tr/Tp =   1.6698 (solved from K =   .7491)

Unit peak,          qp =    47.67 cfs
Unit peak time      Tp =   .11111 hrs
Unit receding limb, Tr =   .44445 hrs
Total unit time,    Tb =   .55557 hrs
```

```
SCS UNIT HYDROGRAPH METHOD

STORM EVENT: 10 year storm
Duration      = 24.0000 hrs     Rain Depth = 3.7400 in
Rain Dir      = H:\Columbus\P\120161\Design\Storm Drainage\
Rain File -ID =  - TypeII  24hr
Unit Hyd Type = Default Curvilinear
HYG Dir       = H:\Columbus\P\120161\Design\Storm Drainage\
HYG File - ID =  - POST-DETAINED 10
Tc            = .1667 hrs
Drainage Area = 7.012 acres  Runoff CN= 88

=============================================
Computational Time Increment   =   .02222 hrs
Computed Peak Time             =  11.9780 hrs
Computed Peak Flow             =    23.55 cfs

Time Increment for HYG File    =    .0100 hrs
Peak Time, Interpolated Output =  11.9802 hrs
Peak Flow, Interpolated Output =    23.53 cfs
=============================================

                DRAINAGE AREA
              -------------------
              ID:POST-DETAINED
              CN   =   88
              Area =       7.012 acres
              S    =   1.3636 in
              0.2S =    .2727 in

               Cumulative Runoff
              -------------------
                      2.4886 in
                       1.454 ac-ft

HYG Volume...          1.454 ac-ft (area under HYG curve)

***** SCS UNIT HYDROGRAPH PARAMETERS *****

Time Concentration, Tc =   .16667 hrs (ID: POST-DETAINED)
Computational Incr, Tm =   .02222 hrs = 0.20000 Tp

Unit Hyd. Shape Factor =  483.432 (37.46% under rising limb)
K =  483.43/645.333,  K =    .7491 (also, K = 2/(1+(Tr/Tp))
Receding/Rising, Tr/Tp =   1.6698 (solved from K =   .7491)

Unit peak,          qp =    47.67 cfs
Unit peak time      Tp =   .11111 hrs
Unit receding limb, Tr =   .44445 hrs
Total unit time,    Tb =   .55557 hrs
```

```
SCS UNIT HYDROGRAPH METHOD

STORM EVENT: 25 year storm
Duration      = 24.0000 hrs     Rain Depth = 4.4400 in
Rain Dir      = H:\Columbus\P\120161\Design\Storm Drainage\
Rain File -ID =  - TypeII  24hr
Unit Hyd Type = Default Curvilinear
HYG Dir       = H:\Columbus\P\120161\Design\Storm Drainage\
HYG File - ID =  - POST-DETAINED 25
Tc            = .1667 hrs
Drainage Area = 7.012 acres  Runoff CN= 88

=============================================
Computational Time Increment   =   .02222 hrs
Computed Peak Time             =  11.9780 hrs
Computed Peak Flow             =    29.45 cfs

Time Increment for HYG File    =    .0100 hrs
Peak Time, Interpolated Output =  11.9802 hrs
Peak Flow, Interpolated Output =    29.43 cfs
=============================================

                DRAINAGE AREA
              -------------------
              ID:POST-DETAINED
              CN    =   88
              Area =       7.012 acres
              S     =   1.3636 in
              0.2S =    .2727 in

               Cumulative Runoff
              -------------------
                      3.1398 in
                       1.835 ac-ft

HYG Volume...          1.835 ac-ft (area under HYG curve)

***** SCS UNIT HYDROGRAPH PARAMETERS *****

Time Concentration, Tc =   .16667 hrs (ID: POST-DETAINED)
Computational Incr, Tm =   .02222 hrs = 0.20000 Tp

Unit Hyd. Shape Factor =  483.432 (37.46% under rising limb)
K =  483.43/645.333,  K =    .7491 (also, K = 2/(1+(Tr/Tp))
Receding/Rising, Tr/Tp =   1.6698 (solved from K =   .7491)

Unit peak,          qp =    47.67 cfs
Unit peak time      Tp =   .11111 hrs
Unit receding limb, Tr =   .44445 hrs
Total unit time,    Tb =   .55557 hrs
```

```
SCS UNIT HYDROGRAPH METHOD

STORM EVENT: 50 year storm
Duration      = 24.0000 hrs     Rain Depth = 5.0200 in
Rain Dir      = H:\Columbus\P\120161\Design\Storm Drainage\
Rain File -ID =  - TypeII  24hr
Unit Hyd Type = Default Curvilinear
HYG Dir       = H:\Columbus\P\120161\Design\Storm Drainage\
HYG File - ID =  - POST-DETAINED 50
Tc            = .1667 hrs
Drainage Area = 7.012 acres  Runoff CN= 88

=============================================
Computational Time Increment   =   .02222 hrs
Computed Peak Time             =  11.9780 hrs
Computed Peak Flow             =    34.35 cfs

Time Increment for HYG File    =    .0100 hrs
Peak Time, Interpolated Output =  11.9802 hrs
Peak Flow, Interpolated Output =    34.31 cfs
=============================================

                DRAINAGE AREA
              -------------------
              ID:POST-DETAINED
              CN    =   88
              Area =       7.012 acres
              S     =   1.3636 in
              0.2S =    .2727 in

               Cumulative Runoff
              -------------------
                      3.6879 in
                       2.155 ac-ft

HYG Volume...          2.155 ac-ft (area under HYG curve)

***** SCS UNIT HYDROGRAPH PARAMETERS *****

Time Concentration, Tc =   .16667 hrs (ID: POST-DETAINED)
Computational Incr, Tm =   .02222 hrs = 0.20000 Tp

Unit Hyd. Shape Factor =  483.432 (37.46% under rising limb)
K =  483.43/645.333,  K =    .7491 (also, K = 2/(1+(Tr/Tp))
Receding/Rising, Tr/Tp =   1.6698 (solved from K =   .7491)

Unit peak,          qp =    47.67 cfs
Unit peak time      Tp =   .11111 hrs
Unit receding limb, Tr =   .44445 hrs
Total unit time,    Tb =   .55557 hrs
```

```
SCS UNIT HYDROGRAPH METHOD

STORM EVENT: 100 year storm
Duration      = 24.0000 hrs     Rain Depth = 5.6300 in
Rain Dir      = H:\Columbus\P\120161\Design\Storm Drainage\
Rain File -ID =  - TypeII  24hr
Unit Hyd Type = Default Curvilinear
HYG Dir       = H:\Columbus\P\120161\Design\Storm Drainage\
HYG File - ID =  - POST-DETAINED 100
Tc            = .1667 hrs
Drainage Area = 7.012 acres  Runoff CN= 88

=============================================
Computational Time Increment   =   .02222 hrs
Computed Peak Time             =  11.9780 hrs
Computed Peak Flow             =    39.49 cfs

Time Increment for HYG File    =    .0100 hrs
Peak Time, Interpolated Output =  11.9802 hrs
Peak Flow, Interpolated Output =    39.44 cfs
=============================================

                DRAINAGE AREA
              ------------------
              ID:POST-DETAINED
              CN    =   88
              Area =       7.012 acres
              S     =   1.3636 in
              0.2S =    .2727 in

               Cumulative Runoff
              -------------------
                      4.2703 in
                       2.495 ac-ft

HYG Volume...          2.495 ac-ft (area under HYG curve)

***** SCS UNIT HYDROGRAPH PARAMETERS *****

Time Concentration, Tc =   .16667 hrs (ID: POST-DETAINED)
Computational Incr, Tm =   .02222 hrs = 0.20000 Tp

Unit Hyd. Shape Factor =  483.432 (37.46% under rising limb)
K =  483.43/645.333,  K =    .7491 (also, K = 2/(1+(Tr/Tp))
Receding/Rising, Tr/Tp =   1.6698 (solved from K =   .7491)

Unit peak,          qp =    47.67 cfs
Unit peak time      Tp =   .11111 hrs
Unit receding limb, Tr =   .44445 hrs
Total unit time,    Tb =   .55557 hrs
```

```
SCS UNIT HYDROGRAPH METHOD

STORM EVENT: 1 year storm
Duration      = 24.0000 hrs     Rain Depth = 2.2000 in
Rain Dir      = H:\Columbus\P\120161\Design\Storm Drainage\
Rain File -ID =  - TypeII  24hr
Unit Hyd Type = Default Curvilinear
HYG Dir       = H:\Columbus\P\120161\Design\Storm Drainage\
HYG File - ID =  - POST-UNDETAINED 1
Tc            = .1853 hrs
Drainage Area = 4.375 acres  Runoff CN= 75

=============================================
Computational Time Increment   =   .02470 hrs
Computed Peak Time             =  12.0300 hrs
Computed Peak Flow             =     2.55 cfs

Time Increment for HYG File    =    .0100 hrs
Peak Time, Interpolated Output =  12.0302 hrs
Peak Flow, Interpolated Output =     2.55 cfs
=============================================

                DRAINAGE AREA
              -------------------
              ID:POST-UNDETAINED
              CN   =   75
              Area =       4.375 acres
              S    =   3.3333 in
              0.2S =    .6667 in

               Cumulative Runoff
              -------------------
                       .4831 in
                        .176 ac-ft

HYG Volume...           .176 ac-ft (area under HYG curve)

***** SCS UNIT HYDROGRAPH PARAMETERS *****

Time Concentration, Tc =   .18527 hrs (ID: POST-UNDETAINED)
Computational Incr, Tm =   .02470 hrs = 0.20000 Tp

Unit Hyd. Shape Factor =  483.432 (37.46% under rising limb)
K =  483.43/645.333,  K =    .7491 (also, K = 2/(1+(Tr/Tp))
Receding/Rising, Tr/Tp =   1.6698 (solved from K =   .7491)

Unit peak,          qp =    26.76 cfs
Unit peak time      Tp =   .12351 hrs
Unit receding limb, Tr =   .49405 hrs
Total unit time,    Tb =   .61756 hrs
```

```
SCS UNIT HYDROGRAPH METHOD

STORM EVENT: 2 year storm
Duration      = 24.0000 hrs     Rain Depth = 2.6300 in
Rain Dir      = H:\Columbus\P\120161\Design\Storm Drainage\
Rain File -ID =  - TypeII  24hr
Unit Hyd Type = Default Curvilinear
HYG Dir       = H:\Columbus\P\120161\Design\Storm Drainage\
HYG File - ID =  - POST-UNDETAINED 2
Tc            = .1853 hrs
Drainage Area = 4.375 acres  Runoff CN= 75

============================================
Computational Time Increment   =   .02470 hrs
Computed Peak Time             =  12.0300 hrs
Computed Peak Flow             =     4.05 cfs

Time Increment for HYG File    =    .0100 hrs
Peak Time, Interpolated Output =  12.0302 hrs
Peak Flow, Interpolated Output =     4.05 cfs
============================================

                DRAINAGE AREA
              -------------------
              ID:POST-UNDETAINED
              CN   =   75
              Area =       4.375 acres
              S    =   3.3333 in
              0.2S =    .6667 in

               Cumulative Runoff
              -------------------
                       .7278 in
                        .265 ac-ft

HYG Volume...            .265 ac-ft (area under HYG curve)

***** SCS UNIT HYDROGRAPH PARAMETERS *****

Time Concentration, Tc =   .18527 hrs (ID: POST-UNDETAINED)
Computational Incr, Tm =   .02470 hrs = 0.20000 Tp

Unit Hyd. Shape Factor =  483.432 (37.46% under rising limb)
K =  483.43/645.333,  K =    .7491 (also, K = 2/(1+(Tr/Tp))
Receding/Rising, Tr/Tp =   1.6698 (solved from K =   .7491)

Unit peak,          qp =    26.76 cfs
Unit peak time      Tp =   .12351 hrs
Unit receding limb, Tr =   .49405 hrs
Total unit time,    Tb =   .61756 hrs
```

```
SCS UNIT HYDROGRAPH METHOD

STORM EVENT: 5 year storm
Duration      = 24.0000 hrs     Rain Depth = 3.2400 in
Rain Dir      = H:\Columbus\P\120161\Design\Storm Drainage\
Rain File -ID =  - TypeII  24hr
Unit Hyd Type = Default Curvilinear
HYG Dir       = H:\Columbus\P\120161\Design\Storm Drainage\
HYG File - ID =  - POST-UNDETAINED 5
Tc            = .1853 hrs
Drainage Area = 4.375 acres  Runoff CN= 75

============================================
Computational Time Increment   =   .02470 hrs
Computed Peak Time             =  12.0300 hrs
Computed Peak Flow             =     6.41 cfs

Time Increment for HYG File    =    .0100 hrs
Peak Time, Interpolated Output =  12.0302 hrs
Peak Flow, Interpolated Output =     6.41 cfs
============================================

                DRAINAGE AREA
              -------------------
              ID:POST-UNDETAINED
              CN   =   75
              Area =       4.375 acres
              S    =   3.3333 in
              0.2S =    .6667 in

               Cumulative Runoff
              -------------------
                      1.1211 in
                        .409 ac-ft

HYG Volume...           .409 ac-ft (area under HYG curve)

***** SCS UNIT HYDROGRAPH PARAMETERS *****

Time Concentration, Tc =   .18527 hrs (ID: POST-UNDETAINED)
Computational Incr, Tm =   .02470 hrs = 0.20000 Tp

Unit Hyd. Shape Factor =  483.432 (37.46% under rising limb)
K =  483.43/645.333,  K =    .7491 (also, K = 2/(1+(Tr/Tp))
Receding/Rising, Tr/Tp =   1.6698 (solved from K =   .7491)

Unit peak,          qp =    26.76 cfs
Unit peak time      Tp =   .12351 hrs
Unit receding limb, Tr =   .49405 hrs
Total unit time,    Tb =   .61756 hrs
```

```
SCS UNIT HYDROGRAPH METHOD

STORM EVENT: 10 year storm
Duration      = 24.0000 hrs     Rain Depth = 3.7400 in
Rain Dir      = H:\Columbus\P\120161\Design\Storm Drainage\
Rain File -ID =  - TypeII  24hr
Unit Hyd Type = Default Curvilinear
HYG Dir       = H:\Columbus\P\120161\Design\Storm Drainage\
HYG File - ID =  - POST-UNDETAINED 10
Tc            = .1853 hrs
Drainage Area = 4.375 acres  Runoff CN= 75

============================================
Computational Time Increment   =   .02470 hrs
Computed Peak Time             =  12.0053 hrs
Computed Peak Flow             =     8.53 cfs

Time Increment for HYG File    =    .0100 hrs
Peak Time, Interpolated Output =  12.0102 hrs
Peak Flow, Interpolated Output =     8.52 cfs
============================================

                 DRAINAGE AREA
               -------------------
               ID:POST-UNDETAINED
               CN   =   75
               Area =       4.375 acres
               S    =   3.3333 in
               0.2S =    .6667 in

                Cumulative Runoff
               -------------------
                       1.4743 in
                         .538 ac-ft

HYG Volume...            .537 ac-ft (area under HYG curve)

***** SCS UNIT HYDROGRAPH PARAMETERS *****

Time Concentration, Tc =   .18527 hrs (ID: POST-UNDETAINED)
Computational Incr, Tm =   .02470 hrs = 0.20000 Tp

Unit Hyd. Shape Factor =  483.432 (37.46% under rising limb)
K =  483.43/645.333,  K =    .7491 (also, K = 2/(1+(Tr/Tp))
Receding/Rising, Tr/Tp =   1.6698 (solved from K =   .7491)

Unit peak,          qp =    26.76 cfs
Unit peak time      Tp =   .12351 hrs
Unit receding limb, Tr =   .49405 hrs
Total unit time,    Tb =   .61756 hrs
```

```
SCS UNIT HYDROGRAPH METHOD

STORM EVENT: 25 year storm
Duration      = 24.0000 hrs     Rain Depth = 4.4400 in
Rain Dir      = H:\Columbus\P\120161\Design\Storm Drainage\
Rain File -ID =  - TypeII  24hr
Unit Hyd Type = Default Curvilinear
HYG Dir       = H:\Columbus\P\120161\Design\Storm Drainage\
HYG File - ID =  - POST-UNDETAINED 25
Tc            = .1853 hrs
Drainage Area = 4.375 acres  Runoff CN= 75

=============================================
Computational Time Increment   =   .02470 hrs
Computed Peak Time             =  12.0053 hrs
Computed Peak Flow             =    11.69 cfs

Time Increment for HYG File    =    .0100 hrs
Peak Time, Interpolated Output =  12.0102 hrs
Peak Flow, Interpolated Output =    11.67 cfs
=============================================

                DRAINAGE AREA
              -------------------
              ID:POST-UNDETAINED
              CN   =   75
              Area =       4.375 acres
              S    =   3.3333 in
              0.2S =    .6667 in

               Cumulative Runoff
              -------------------
                      2.0035 in
                        .730 ac-ft

HYG Volume...           .730 ac-ft (area under HYG curve)

***** SCS UNIT HYDROGRAPH PARAMETERS *****

Time Concentration, Tc =   .18527 hrs (ID: POST-UNDETAINED)
Computational Incr, Tm =   .02470 hrs = 0.20000 Tp

Unit Hyd. Shape Factor =  483.432 (37.46% under rising limb)
K =  483.43/645.333,  K =    .7491 (also, K = 2/(1+(Tr/Tp))
Receding/Rising, Tr/Tp =   1.6698 (solved from K =   .7491)

Unit peak,          qp =    26.76 cfs
Unit peak time      Tp =   .12351 hrs
Unit receding limb, Tr =   .49405 hrs
Total unit time,    Tb =   .61756 hrs
```

```
SCS UNIT HYDROGRAPH METHOD

STORM EVENT: 50 year storm
Duration      = 24.0000 hrs     Rain Depth = 5.0200 in
Rain Dir      = H:\Columbus\P\120161\Design\Storm Drainage\
Rain File -ID =  - TypeII  24hr
Unit Hyd Type = Default Curvilinear
HYG Dir       = H:\Columbus\P\120161\Design\Storm Drainage\
HYG File - ID =  - POST-UNDETAINED 50
Tc            = .1853 hrs
Drainage Area = 4.375 acres  Runoff CN= 75

============================================
Computational Time Increment   =   .02470 hrs
Computed Peak Time             =  12.0053 hrs
Computed Peak Flow             =    14.42 cfs

Time Increment for HYG File    =    .0100 hrs
Peak Time, Interpolated Output =  12.0102 hrs
Peak Flow, Interpolated Output =    14.38 cfs
============================================

                 DRAINAGE AREA
               -------------------
               ID:POST-UNDETAINED
               CN   =   75
               Area =       4.375 acres
               S    =   3.3333 in
               0.2S =    .6667 in

                Cumulative Runoff
               -------------------
                       2.4655 in
                         .899 ac-ft

HYG Volume...            .899 ac-ft (area under HYG curve)

***** SCS UNIT HYDROGRAPH PARAMETERS *****

Time Concentration, Tc =   .18527 hrs (ID: POST-UNDETAINED)
Computational Incr, Tm =   .02470 hrs = 0.20000 Tp

Unit Hyd. Shape Factor =  483.432 (37.46% under rising limb)
K =  483.43/645.333,  K =    .7491 (also, K = 2/(1+(Tr/Tp))
Receding/Rising, Tr/Tp =   1.6698 (solved from K =   .7491)

Unit peak,          qp =    26.76 cfs
Unit peak time      Tp =   .12351 hrs
Unit receding limb, Tr =   .49405 hrs
Total unit time,    Tb =   .61756 hrs
```

```
SCS UNIT HYDROGRAPH METHOD

STORM EVENT: 100 year storm
Duration      = 24.0000 hrs     Rain Depth = 5.6300 in
Rain Dir      = H:\Columbus\P\120161\Design\Storm Drainage\
Rain File -ID =  - TypeII  24hr
Unit Hyd Type = Default Curvilinear
HYG Dir       = H:\Columbus\P\120161\Design\Storm Drainage\
HYG File - ID =  - POST-UNDETAINED 100
Tc            = .1853 hrs
Drainage Area = 4.375 acres  Runoff CN= 75

============================================
Computational Time Increment   =   .02470 hrs
Computed Peak Time             =  12.0053 hrs
Computed Peak Flow             =    17.36 cfs

Time Increment for HYG File    =    .0100 hrs
Peak Time, Interpolated Output =  12.0102 hrs
Peak Flow, Interpolated Output =    17.31 cfs
============================================

                DRAINAGE AREA
              -------------------
              ID:POST-UNDETAINED
              CN    =   75
              Area =       4.375 acres
              S     =   3.3333 in
              0.2S =    .6667 in

               Cumulative Runoff
              -------------------
                      2.9692 in
                       1.083 ac-ft

HYG Volume...          1.083 ac-ft (area under HYG curve)

***** SCS UNIT HYDROGRAPH PARAMETERS *****

Time Concentration, Tc =   .18527 hrs (ID: POST-UNDETAINED)
Computational Incr, Tm =   .02470 hrs = 0.20000 Tp

Unit Hyd. Shape Factor =  483.432 (37.46% under rising limb)
K =  483.43/645.333,  K =    .7491 (also, K = 2/(1+(Tr/Tp))
Receding/Rising, Tr/Tp =   1.6698 (solved from K =   .7491)

Unit peak,          qp =    26.76 cfs
Unit peak time      Tp =   .12351 hrs
Unit receding limb, Tr =   .49405 hrs
Total unit time,    Tb =   .61756 hrs
```

```
SCS UNIT HYDROGRAPH METHOD

STORM EVENT: 1 year storm
Duration      = 24.0000 hrs     Rain Depth = 2.2000 in
Rain Dir      = H:\Columbus\P\120161\Design\Storm Drainage\
Rain File -ID =  - TypeII  24hr
Unit Hyd Type = Default Curvilinear
HYG Dir       = H:\Columbus\P\120161\Design\Storm Drainage\
HYG File - ID =  - PRE-DETAINED 1
Tc            = .3748 hrs
Drainage Area = 9.903 acres  Runoff CN= 82

============================================
Computational Time Increment   =   .04997 hrs
Computed Peak Time             =  12.1428 hrs
Computed Peak Flow             =     7.49 cfs

Time Increment for HYG File    =    .0100 hrs
Peak Time, Interpolated Output =  12.1402 hrs
Peak Flow, Interpolated Output =     7.49 cfs
============================================

                DRAINAGE AREA
              -------------------
              ID:PRE-DETAINED
              CN   =   82
              Area =       9.903 acres
              S    =   2.1951 in
              0.2S =    .4390 in

               Cumulative Runoff
              -------------------
                       .7839 in
                        .647 ac-ft

HYG Volume...           .647 ac-ft (area under HYG curve)

***** SCS UNIT HYDROGRAPH PARAMETERS *****

Time Concentration, Tc =   .37478 hrs (ID: PRE-DETAINED)
Computational Incr, Tm =   .04997 hrs = 0.20000 Tp

Unit Hyd. Shape Factor =  483.432 (37.46% under rising limb)
K =  483.43/645.333,  K =    .7491 (also, K = 2/(1+(Tr/Tp))
Receding/Rising, Tr/Tp =   1.6698 (solved from K =   .7491)

Unit peak,          qp =    29.94 cfs
Unit peak time      Tp =   .24985 hrs
Unit receding limb, Tr =   .99941 hrs
Total unit time,    Tb =  1.24926 hrs
```

```
SCS UNIT HYDROGRAPH METHOD

STORM EVENT: 2 year storm
Duration      = 24.0000 hrs     Rain Depth = 2.6300 in
Rain Dir      = H:\Columbus\P\120161\Design\Storm Drainage\
Rain File -ID =  - TypeII  24hr
Unit Hyd Type = Default Curvilinear
HYG Dir       = H:\Columbus\P\120161\Design\Storm Drainage\
HYG File - ID =  - PRE-DETAINED 2
Tc            = .3748 hrs
Drainage Area = 9.903 acres  Runoff CN= 82

=============================================
Computational Time Increment   =   .04997 hrs
Computed Peak Time             =  12.1428 hrs
Computed Peak Flow             =    10.64 cfs

Time Increment for HYG File    =    .0100 hrs
Peak Time, Interpolated Output =  12.1402 hrs
Peak Flow, Interpolated Output =    10.64 cfs
=============================================

                DRAINAGE AREA
              -------------------
              ID:PRE-DETAINED
              CN    =   82
              Area =       9.903 acres
              S     =   2.1951 in
              0.2S =    .4390 in

               Cumulative Runoff
              -------------------
                      1.0945 in
                        .903 ac-ft

HYG Volume...           .903 ac-ft (area under HYG curve)

***** SCS UNIT HYDROGRAPH PARAMETERS *****

Time Concentration, Tc =   .37478 hrs (ID: PRE-DETAINED)
Computational Incr, Tm =   .04997 hrs = 0.20000 Tp

Unit Hyd. Shape Factor =  483.432 (37.46% under rising limb)
K =  483.43/645.333,  K =    .7491 (also, K = 2/(1+(Tr/Tp))
Receding/Rising, Tr/Tp =   1.6698 (solved from K =   .7491)

Unit peak,          qp =    29.94 cfs
Unit peak time      Tp =   .24985 hrs
Unit receding limb, Tr =   .99941 hrs
Total unit time,    Tb =  1.24926 hrs
```

```
SCS UNIT HYDROGRAPH METHOD

STORM EVENT: 5 year storm
Duration      = 24.0000 hrs     Rain Depth = 3.2400 in
Rain Dir      = H:\Columbus\P\120161\Design\Storm Drainage\
Rain File -ID =  - TypeII  24hr
Unit Hyd Type = Default Curvilinear
HYG Dir       = H:\Columbus\P\120161\Design\Storm Drainage\
HYG File - ID =  - PRE-DETAINED 5
Tc            = .3748 hrs
Drainage Area = 9.903 acres  Runoff CN= 82

=============================================
Computational Time Increment   =   .04997 hrs
Computed Peak Time             =  12.0929 hrs
Computed Peak Flow             =    15.49 cfs

Time Increment for HYG File    =    .0100 hrs
Peak Time, Interpolated Output =  12.1002 hrs
Peak Flow, Interpolated Output =    15.47 cfs
=============================================

                DRAINAGE AREA
              -------------------
              ID:PRE-DETAINED
              CN   =   82
              Area =       9.903 acres
              S    =   2.1951 in
              0.2S =    .4390 in

               Cumulative Runoff
              -------------------
                      1.5703 in
                       1.296 ac-ft

HYG Volume...          1.296 ac-ft (area under HYG curve)

***** SCS UNIT HYDROGRAPH PARAMETERS *****

Time Concentration, Tc =   .37478 hrs (ID: PRE-DETAINED)
Computational Incr, Tm =   .04997 hrs = 0.20000 Tp

Unit Hyd. Shape Factor =  483.432 (37.46% under rising limb)
K =  483.43/645.333,  K =    .7491 (also, K = 2/(1+(Tr/Tp))
Receding/Rising, Tr/Tp =   1.6698 (solved from K =   .7491)

Unit peak,          qp =    29.94 cfs
Unit peak time      Tp =   .24985 hrs
Unit receding limb, Tr =   .99941 hrs
Total unit time,    Tb =  1.24926 hrs
```

```
SCS UNIT HYDROGRAPH METHOD

STORM EVENT: 10 year storm
Duration      = 24.0000 hrs     Rain Depth = 3.7400 in
Rain Dir      = H:\Columbus\P\120161\Design\Storm Drainage\
Rain File -ID =  - TypeII  24hr
Unit Hyd Type = Default Curvilinear
HYG Dir       = H:\Columbus\P\120161\Design\Storm Drainage\
HYG File - ID =  - PRE-DETAINED 10
Tc            = .3748 hrs
Drainage Area = 9.903 acres  Runoff CN= 82

=============================================
Computational Time Increment   =   .04997 hrs
Computed Peak Time             =  12.0929 hrs
Computed Peak Flow             =    19.67 cfs

Time Increment for HYG File    =    .0100 hrs
Peak Time, Interpolated Output =  12.1002 hrs
Peak Flow, Interpolated Output =    19.64 cfs
=============================================

                 DRAINAGE AREA
              -------------------
              ID:PRE-DETAINED
              CN   =   82
              Area =       9.903 acres
              S    =   2.1951 in
              0.2S =    .4390 in

               Cumulative Runoff
              -------------------
                      1.9826 in
                       1.636 ac-ft

HYG Volume...          1.636 ac-ft (area under HYG curve)

***** SCS UNIT HYDROGRAPH PARAMETERS *****

Time Concentration, Tc =   .37478 hrs (ID: PRE-DETAINED)
Computational Incr, Tm =   .04997 hrs = 0.20000 Tp

Unit Hyd. Shape Factor =  483.432 (37.46% under rising limb)
K =  483.43/645.333,  K =    .7491 (also, K = 2/(1+(Tr/Tp))
Receding/Rising, Tr/Tp =   1.6698 (solved from K =   .7491)

Unit peak,          qp =    29.94 cfs
Unit peak time      Tp =   .24985 hrs
Unit receding limb, Tr =   .99941 hrs
Total unit time,    Tb =  1.24926 hrs
```

```
SCS UNIT HYDROGRAPH METHOD

STORM EVENT: 25 year storm
Duration      = 24.0000 hrs     Rain Depth = 4.4400 in
Rain Dir      = H:\Columbus\P\120161\Design\Storm Drainage\
Rain File -ID =  - TypeII  24hr
Unit Hyd Type = Default Curvilinear
HYG Dir       = H:\Columbus\P\120161\Design\Storm Drainage\
HYG File - ID =  - PRE-DETAINED 25
Tc            = .3748 hrs
Drainage Area = 9.903 acres  Runoff CN= 82

=============================================
Computational Time Increment   =   .04997 hrs
Computed Peak Time             =  12.0929 hrs
Computed Peak Flow             =    25.70 cfs

Time Increment for HYG File    =    .0100 hrs
Peak Time, Interpolated Output =  12.1002 hrs
Peak Flow, Interpolated Output =    25.64 cfs
=============================================

                 DRAINAGE AREA
              -------------------
              ID:PRE-DETAINED
              CN   =   82
              Area =       9.903 acres
              S    =   2.1951 in
              0.2S =    .4390 in

               Cumulative Runoff
              -------------------
                      2.5835 in
                       2.132 ac-ft

HYG Volume...          2.132 ac-ft (area under HYG curve)

***** SCS UNIT HYDROGRAPH PARAMETERS *****

Time Concentration, Tc =   .37478 hrs (ID: PRE-DETAINED)
Computational Incr, Tm =   .04997 hrs = 0.20000 Tp

Unit Hyd. Shape Factor =  483.432 (37.46% under rising limb)
K =  483.43/645.333,  K =    .7491 (also, K = 2/(1+(Tr/Tp))
Receding/Rising, Tr/Tp =   1.6698 (solved from K =   .7491)

Unit peak,          qp =    29.94 cfs
Unit peak time      Tp =   .24985 hrs
Unit receding limb, Tr =   .99941 hrs
Total unit time,    Tb =  1.24926 hrs
```

```
SCS UNIT HYDROGRAPH METHOD

STORM EVENT: 50 year storm
Duration      = 24.0000 hrs     Rain Depth = 5.0200 in
Rain Dir      = H:\Columbus\P\120161\Design\Storm Drainage\
Rain File -ID =  - TypeII  24hr
Unit Hyd Type = Default Curvilinear
HYG Dir       = H:\Columbus\P\120161\Design\Storm Drainage\
HYG File - ID =  - PRE-DETAINED 50
Tc            = .3748 hrs
Drainage Area = 9.903 acres  Runoff CN= 82

============================================
Computational Time Increment   =   .04997 hrs
Computed Peak Time             =  12.0929 hrs
Computed Peak Flow             =    30.79 cfs

Time Increment for HYG File    =    .0100 hrs
Peak Time, Interpolated Output =  12.1002 hrs
Peak Flow, Interpolated Output =    30.71 cfs
============================================

                DRAINAGE AREA
              -------------------
              ID:PRE-DETAINED
              CN   =   82
              Area =       9.903 acres
              S    =   2.1951 in
              0.2S =    .4390 in

               Cumulative Runoff
              -------------------
                      3.0970 in
                       2.556 ac-ft

HYG Volume...          2.556 ac-ft (area under HYG curve)

***** SCS UNIT HYDROGRAPH PARAMETERS *****

Time Concentration, Tc =   .37478 hrs (ID: PRE-DETAINED)
Computational Incr, Tm =   .04997 hrs = 0.20000 Tp

Unit Hyd. Shape Factor =  483.432 (37.46% under rising limb)
K =  483.43/645.333,  K =    .7491 (also, K = 2/(1+(Tr/Tp))
Receding/Rising, Tr/Tp =   1.6698 (solved from K =   .7491)

Unit peak,          qp =    29.94 cfs
Unit peak time      Tp =   .24985 hrs
Unit receding limb, Tr =   .99941 hrs
Total unit time,    Tb =  1.24926 hrs
```

```
SCS UNIT HYDROGRAPH METHOD

STORM EVENT: 100 year storm
Duration      = 24.0000 hrs     Rain Depth = 5.6300 in
Rain Dir      = H:\Columbus\P\120161\Design\Storm Drainage\
Rain File -ID =  - TypeII  24hr
Unit Hyd Type = Default Curvilinear
HYG Dir       = H:\Columbus\P\120161\Design\Storm Drainage\
HYG File - ID =  - PRE-DETAINED 100
Tc            = .3748 hrs
Drainage Area = 9.903 acres  Runoff CN= 82

=============================================
Computational Time Increment   =   .04997 hrs
Computed Peak Time             =  12.0929 hrs
Computed Peak Flow             =    36.20 cfs

Time Increment for HYG File    =    .0100 hrs
Peak Time, Interpolated Output =  12.1002 hrs
Peak Flow, Interpolated Output =    36.09 cfs
=============================================

                DRAINAGE AREA
              -------------------
              ID:PRE-DETAINED
              CN    =   82
              Area =       9.903 acres
              S     =   2.1951 in
              0.2S =    .4390 in

               Cumulative Runoff
              --------------------
                      3.6482 in
                       3.011 ac-ft

HYG Volume...          3.011 ac-ft (area under HYG curve)

***** SCS UNIT HYDROGRAPH PARAMETERS *****

Time Concentration, Tc =   .37478 hrs (ID: PRE-DETAINED)
Computational Incr, Tm =   .04997 hrs = 0.20000 Tp

Unit Hyd. Shape Factor =  483.432 (37.46% under rising limb)
K =  483.43/645.333,  K =    .7491 (also, K = 2/(1+(Tr/Tp))
Receding/Rising, Tr/Tp =   1.6698 (solved from K =   .7491)

Unit peak,          qp =    29.94 cfs
Unit peak time      Tp =   .24985 hrs
Unit receding limb, Tr =   .99941 hrs
Total unit time,    Tb =  1.24926 hrs
```

```
SCS UNIT HYDROGRAPH METHOD

STORM EVENT: 1 year storm
Duration      = 24.0000 hrs     Rain Depth = 2.2000 in
Rain Dir      = H:\Columbus\P\120161\Design\Storm Drainage\
Rain File -ID =  - TypeII  24hr
Unit Hyd Type = Default Curvilinear
HYG Dir       = H:\Columbus\P\120161\Design\Storm Drainage\
HYG File - ID =  - PRE-UNDETAINED 1
Tc            = .1716 hrs
Drainage Area = 1.486 acres  Runoff CN= 74

============================================
Computational Time Increment   =   .02288 hrs
Computed Peak Time             =  12.0364 hrs
Computed Peak Flow             =      .80 cfs

Time Increment for HYG File    =    .0100 hrs
Peak Time, Interpolated Output =  12.0302 hrs
Peak Flow, Interpolated Output =      .80 cfs
============================================

                DRAINAGE AREA
              -------------------
              ID:PRE-UNDETAINED
              CN   =   74
              Area =       1.486 acres
              S    =   3.5135 in
              0.2S =    .7027 in

               Cumulative Runoff
              -------------------
                       .4474 in
                        .055 ac-ft

HYG Volume...           .055 ac-ft (area under HYG curve)

***** SCS UNIT HYDROGRAPH PARAMETERS *****

Time Concentration, Tc =   .17162 hrs (ID: PRE-UNDETAINED)
Computational Incr, Tm =   .02288 hrs = 0.20000 Tp

Unit Hyd. Shape Factor =  483.432 (37.46% under rising limb)
K =  483.43/645.333,  K =    .7491 (also, K = 2/(1+(Tr/Tp))
Receding/Rising, Tr/Tp =   1.6698 (solved from K =   .7491)

Unit peak,          qp =     9.81 cfs
Unit peak time      Tp =   .11441 hrs
Unit receding limb, Tr =   .45766 hrs
Total unit time,    Tb =   .57207 hrs
```

```
SCS UNIT HYDROGRAPH METHOD

STORM EVENT: 2 year storm
Duration      = 24.0000 hrs     Rain Depth = 2.6300 in
Rain Dir      = H:\Columbus\P\120161\Design\Storm Drainage\
Rain File -ID =  - TypeII  24hr
Unit Hyd Type = Default Curvilinear
HYG Dir       = H:\Columbus\P\120161\Design\Storm Drainage\
HYG File - ID =  - PRE-UNDETAINED 2
Tc            = .1716 hrs
Drainage Area = 1.486 acres  Runoff CN= 74

============================================
Computational Time Increment   =   .02288 hrs
Computed Peak Time             =  12.0135 hrs
Computed Peak Flow             =     1.30 cfs

Time Increment for HYG File    =    .0100 hrs
Peak Time, Interpolated Output =  12.0202 hrs
Peak Flow, Interpolated Output =     1.30 cfs
============================================

                 DRAINAGE AREA
               -------------------
               ID:PRE-UNDETAINED
               CN    =   74
               Area =       1.486 acres
               S     =   3.5135 in
               0.2S =    .7027 in

                Cumulative Runoff
               -------------------
                         .6827 in
                          .085 ac-ft

HYG Volume...             .085 ac-ft (area under HYG curve)

***** SCS UNIT HYDROGRAPH PARAMETERS *****

Time Concentration, Tc =   .17162 hrs (ID: PRE-UNDETAINED)
Computational Incr, Tm =   .02288 hrs = 0.20000 Tp

Unit Hyd. Shape Factor =  483.432 (37.46% under rising limb)
K =  483.43/645.333,  K =    .7491 (also, K = 2/(1+(Tr/Tp))
Receding/Rising, Tr/Tp =   1.6698 (solved from K =   .7491)

Unit peak,          qp =     9.81 cfs
Unit peak time      Tp =   .11441 hrs
Unit receding limb, Tr =   .45766 hrs
Total unit time,    Tb =   .57207 hrs
```

```
SCS UNIT HYDROGRAPH METHOD

STORM EVENT: 5 year storm
Duration      = 24.0000 hrs     Rain Depth = 3.2400 in
Rain Dir      = H:\Columbus\P\120161\Design\Storm Drainage\
Rain File -ID =  - TypeII  24hr
Unit Hyd Type = Default Curvilinear
HYG Dir       = H:\Columbus\P\120161\Design\Storm Drainage\
HYG File - ID =  - PRE-UNDETAINED 5
Tc            = .1716 hrs
Drainage Area = 1.486 acres  Runoff CN= 74

============================================
Computational Time Increment   =   .02288 hrs
Computed Peak Time             =  12.0135 hrs
Computed Peak Flow             =     2.10 cfs

Time Increment for HYG File    =    .0100 hrs
Peak Time, Interpolated Output =  12.0102 hrs
Peak Flow, Interpolated Output =     2.10 cfs
============================================

                DRAINAGE AREA
              -------------------
              ID:PRE-UNDETAINED
              CN   =   74
              Area =       1.486 acres
              S    =   3.5135 in
              0.2S =    .7027 in

               Cumulative Runoff
              -------------------
                      1.0640 in
                        .132 ac-ft

HYG Volume...           .132 ac-ft (area under HYG curve)

***** SCS UNIT HYDROGRAPH PARAMETERS *****

Time Concentration, Tc =   .17162 hrs (ID: PRE-UNDETAINED)
Computational Incr, Tm =   .02288 hrs = 0.20000 Tp

Unit Hyd. Shape Factor =  483.432 (37.46% under rising limb)
K =  483.43/645.333,  K =    .7491 (also, K = 2/(1+(Tr/Tp))
Receding/Rising, Tr/Tp =   1.6698 (solved from K =   .7491)

Unit peak,          qp =     9.81 cfs
Unit peak time      Tp =   .11441 hrs
Unit receding limb, Tr =   .45766 hrs
Total unit time,    Tb =   .57207 hrs
```

```
SCS UNIT HYDROGRAPH METHOD

STORM EVENT: 10 year storm
Duration      = 24.0000 hrs     Rain Depth = 3.7400 in
Rain Dir      = H:\Columbus\P\120161\Design\Storm Drainage\
Rain File -ID =  - TypeII  24hr
Unit Hyd Type = Default Curvilinear
HYG Dir       = H:\Columbus\P\120161\Design\Storm Drainage\
HYG File - ID =  - PRE-UNDETAINED 10
Tc            = .1716 hrs
Drainage Area = 1.486 acres  Runoff CN= 74

============================================
Computational Time Increment   =   .02288 hrs
Computed Peak Time             =  12.0135 hrs
Computed Peak Flow             =     2.81 cfs

Time Increment for HYG File    =    .0100 hrs
Peak Time, Interpolated Output =  12.0102 hrs
Peak Flow, Interpolated Output =     2.81 cfs
============================================

                DRAINAGE AREA
              -------------------
              ID:PRE-UNDETAINED
              CN   =   74
              Area =       1.486 acres
              S    =   3.5135 in
              0.2S =    .7027 in

               Cumulative Runoff
              -------------------
                      1.4082 in
                        .174 ac-ft

HYG Volume...           .174 ac-ft (area under HYG curve)

***** SCS UNIT HYDROGRAPH PARAMETERS *****

Time Concentration, Tc =   .17162 hrs (ID: PRE-UNDETAINED)
Computational Incr, Tm =   .02288 hrs = 0.20000 Tp

Unit Hyd. Shape Factor =  483.432 (37.46% under rising limb)
K =  483.43/645.333,  K =    .7491 (also, K = 2/(1+(Tr/Tp))
Receding/Rising, Tr/Tp =   1.6698 (solved from K =   .7491)

Unit peak,          qp =     9.81 cfs
Unit peak time      Tp =   .11441 hrs
Unit receding limb, Tr =   .45766 hrs
Total unit time,    Tb =   .57207 hrs
```

```
SCS UNIT HYDROGRAPH METHOD

STORM EVENT: 25 year storm
Duration      = 24.0000 hrs     Rain Depth = 4.4400 in
Rain Dir      = H:\Columbus\P\120161\Design\Storm Drainage\
Rain File -ID =  - TypeII  24hr
Unit Hyd Type = Default Curvilinear
HYG Dir       = H:\Columbus\P\120161\Design\Storm Drainage\
HYG File - ID =  - PRE-UNDETAINED 25
Tc            = .1716 hrs
Drainage Area = 1.486 acres  Runoff CN= 74

=============================================
Computational Time Increment   =   .02288 hrs
Computed Peak Time             =  12.0135 hrs
Computed Peak Flow             =     3.87 cfs

Time Increment for HYG File    =    .0100 hrs
Peak Time, Interpolated Output =  12.0102 hrs
Peak Flow, Interpolated Output =     3.87 cfs
=============================================

                 DRAINAGE AREA
               -------------------
               ID:PRE-UNDETAINED
               CN    =   74
               Area =       1.486 acres
               S     =   3.5135 in
               0.2S =    .7027 in

                Cumulative Runoff
               -------------------
                       1.9263 in
                         .239 ac-ft

HYG Volume...            .239 ac-ft (area under HYG curve)

***** SCS UNIT HYDROGRAPH PARAMETERS *****

Time Concentration, Tc =   .17162 hrs (ID: PRE-UNDETAINED)
Computational Incr, Tm =   .02288 hrs = 0.20000 Tp

Unit Hyd. Shape Factor =  483.432 (37.46% under rising limb)
K =  483.43/645.333,  K =    .7491 (also, K = 2/(1+(Tr/Tp))
Receding/Rising, Tr/Tp =   1.6698 (solved from K =   .7491)

Unit peak,          qp =     9.81 cfs
Unit peak time      Tp =   .11441 hrs
Unit receding limb, Tr =   .45766 hrs
Total unit time,    Tb =   .57207 hrs
```

```
SCS UNIT HYDROGRAPH METHOD

STORM EVENT: 50 year storm
Duration      = 24.0000 hrs     Rain Depth = 5.0200 in
Rain Dir      = H:\Columbus\P\120161\Design\Storm Drainage\
Rain File -ID =  - TypeII  24hr
Unit Hyd Type = Default Curvilinear
HYG Dir       = H:\Columbus\P\120161\Design\Storm Drainage\
HYG File - ID =  - PRE-UNDETAINED 50
Tc            = .1716 hrs
Drainage Area = 1.486 acres  Runoff CN= 74

============================================
Computational Time Increment   =   .02288 hrs
Computed Peak Time             =  11.9906 hrs
Computed Peak Flow             =     4.80 cfs

Time Increment for HYG File    =    .0100 hrs
Peak Time, Interpolated Output =  11.9902 hrs
Peak Flow, Interpolated Output =     4.80 cfs
============================================

                 DRAINAGE AREA
               -------------------
               ID:PRE-UNDETAINED
               CN    =   74
               Area =       1.486 acres
               S     =   3.5135 in
               0.2S =    .7027 in

                Cumulative Runoff
               -------------------
                       2.3802 in
                         .295 ac-ft

HYG Volume...            .295 ac-ft (area under HYG curve)

***** SCS UNIT HYDROGRAPH PARAMETERS *****

Time Concentration, Tc =   .17162 hrs (ID: PRE-UNDETAINED)
Computational Incr, Tm =   .02288 hrs = 0.20000 Tp

Unit Hyd. Shape Factor =  483.432 (37.46% under rising limb)
K =  483.43/645.333,  K =    .7491 (also, K = 2/(1+(Tr/Tp))
Receding/Rising, Tr/Tp =   1.6698 (solved from K =   .7491)

Unit peak,          qp =     9.81 cfs
Unit peak time      Tp =   .11441 hrs
Unit receding limb, Tr =   .45766 hrs
Total unit time,    Tb =   .57207 hrs
```

```
SCS UNIT HYDROGRAPH METHOD

STORM EVENT: 100 year storm
Duration      = 24.0000 hrs     Rain Depth = 5.6300 in
Rain Dir      = H:\Columbus\P\120161\Design\Storm Drainage\
Rain File -ID =  - TypeII  24hr
Unit Hyd Type = Default Curvilinear
HYG Dir       = H:\Columbus\P\120161\Design\Storm Drainage\
HYG File - ID =  - PRE-UNDETAINED 100
Tc            = .1716 hrs
Drainage Area = 1.486 acres  Runoff CN= 74

============================================
Computational Time Increment   =   .02288 hrs
Computed Peak Time             =  11.9906 hrs
Computed Peak Flow             =     5.81 cfs

Time Increment for HYG File    =    .0100 hrs
Peak Time, Interpolated Output =  11.9902 hrs
Peak Flow, Interpolated Output =     5.81 cfs
============================================

                DRAINAGE AREA
              -------------------
              ID:PRE-UNDETAINED
              CN   =   74
              Area =       1.486 acres
              S    =   3.5135 in
              0.2S =    .7027 in

               Cumulative Runoff
              -------------------
                      2.8763 in
                        .356 ac-ft

HYG Volume...           .356 ac-ft (area under HYG curve)

***** SCS UNIT HYDROGRAPH PARAMETERS *****

Time Concentration, Tc =   .17162 hrs (ID: PRE-UNDETAINED)
Computational Incr, Tm =   .02288 hrs = 0.20000 Tp

Unit Hyd. Shape Factor =  483.432 (37.46% under rising limb)
K =  483.43/645.333,  K =    .7491 (also, K = 2/(1+(Tr/Tp))
Receding/Rising, Tr/Tp =   1.6698 (solved from K =   .7491)

Unit peak,          qp =     9.81 cfs
Unit peak time      Tp =   .11441 hrs
Unit receding limb, Tr =   .45766 hrs
Total unit time,    Tb =   .57207 hrs
```

Elevation (ft)	Planimeter (sq.in)	Area (sq.ft)	A1+A2+sqr(A1*A2) (sq.ft)	Volume (ac-ft)	Volume Sum (ac-ft)
801.50	-----	2	0	.000	.000
802.00	-----	638	676	.003	.003
803.00	-----	6385	9041	.069	.072
807.00	-----	12372	27645	.846	.918

POND VOLUME EQUATIONS

* Incremental volume computed by the Conic Method for Reservoir Volumes.

Volume = (1/3) * (EL2-EL1) * (Area1 + Area2 + sq.rt.(Area1*Area2))

where: EL1, EL2 = Lower and upper elevations of the increment
Area1,Area2 = Areas computed for EL1, EL2, respectively
Volume = Incremental volume between EL1 and EL2

REQUESTED POND WS ELEVATIONS:

Min. Elev.= 801.50 ft
Increment = .01 ft
Max. Elev.= 807.00 ft

```
*********************************************
                OUTLET CONNECTIVITY
*********************************************

 ---> Forward Flow Only (UpStream to DnStream)
<---  Reverse Flow Only (DnStream to UpStream)
<---> Forward and Reverse Both Allowed
```

Structure	No.		Outfall	E1, ft	E2, ft
Orifice-Circular	WQ	--->	C0	801.500	807.000
Orifice-Area	O0	--->	C0	803.550	807.000
Orifice-Area	O1	--->	C0	804.720	807.000
Culvert-Circular	C0	--->	TW	801.270	807.000
TW SETUP, DS Channel					

OUTLET STRUCTURE INPUT DATA

```
Structure ID      = WQ
Structure Type    = Orifice-Circular
------------------------------------
# of Openings     =         1
Invert Elev.      =    801.50 ft
Diameter          =     .0938 ft
Orifice Coeff.    =      .600


Structure ID      = O0
Structure Type    = Orifice-Area
------------------------------------
# of Openings     =         1
Invert Elev.      =    803.55 ft
Area              =     .8333 sq.ft
Top of Orifice    =    803.97 ft
Datum Elev.       =    803.76 ft
Orifice Coeff.    =      .600


Structure ID      = O1
Structure Type    = Orifice-Area
------------------------------------
# of Openings     =         2
Invert Elev.      =    804.72 ft
Area              =    2.0000 sq.ft
Top of Orifice    =    805.72 ft
Datum Elev.       =    805.22 ft
Orifice Coeff.    =      .600
```

OUTLET STRUCTURE INPUT DATA

```
Structure ID       = C0
Structure Type     = Culvert-Circular
-----------------------------------
No. Barrels        =         1
Barrel Diameter    =    1.5000 ft
Upstream Invert    =    801.27 ft
Dnstream Invert    =    801.08 ft
Horiz. Length      =     38.00 ft
Barrel Length      =     38.00 ft
Barrel Slope       =    .00500 ft/ft

OUTLET CONTROL DATA...
Mannings n         =     .0130
Ke                 =     .2000  (forward entrance loss)
Kb                 =   .018213  (per ft of full flow)
Kr                 =     .2000  (reverse entrance loss)
HW Convergence     =      .001  +/- ft

INLET CONTROL DATA...
Equation form      =         1
Inlet Control K    =     .0018
Inlet Control M    =    2.0000
Inlet Control c    =    .02920
Inlet Control Y    =     .7400
T1 ratio (HW/D)    =     1.060
T2 ratio (HW/D)    =     1.205
Slope Factor       =     -.500

Use unsubmerged inlet control Form 1 equ. below T1 elev.
Use   submerged inlet control Form 1 equ. above T2 elev.

In transition zone between unsubmerged and submerged inlet control,
interpolate between flows at T1 & T2...
At T1 Elev =    802.86 ft  --->  Flow =      7.58 cfs
At T2 Elev =    803.08 ft  --->  Flow =      8.66 cfs


Structure ID       = TW
Structure Type     = TW SETUP, DS Channel
-----------------------------------
FREE OUTFALL CONDITIONS SPECIFIED

CONVERGENCE TOLERANCES...
Maximum Iterations=    40
Min. TW tolerance =    .01 ft
Max. TW tolerance =    .01 ft
Min. HW tolerance =    .01 ft
Max. HW tolerance =    .01 ft
Min.  Q tolerance =    .00 cfs
Max.  Q tolerance =    .00 cfs
```

LEVEL POOL ROUTING SUMMARY

```
HYG Dir          = H:\Columbus\P\120161\Design\Storm Drainage\
Inflow  HYG file = NONE STORED - P-DETENTION  IN  1
Outflow HYG file = NONE STORED - P-DETENTION  OUT 1

Pond Node   Data = P-DETENTION
Pond Volume Data = P-DETENTION
Pond Outlet Data = Outlet 1

No Infiltration

INITIAL CONDITIONS
----------------------------------
Starting WS Elev   =   801.50 ft
Starting Volume    =     .000 ac-ft
Starting Outflow   =      .00 cfs
Starting Infiltr.  =      .00 cfs
Starting Total Qout=      .00 cfs
Time Increment     =    .0100 hrs


INFLOW/OUTFLOW HYDROGRAPH SUMMARY
=====================================================
Peak Inflow       =     10.85 cfs    at   12.0000 hrs
Peak Outflow      =      2.87 cfs    at   12.2100 hrs
-----------------------------------------------------
Peak Elevation    =    804.25 ft
Peak Storage =           .279 ac-ft
=====================================================


MASS BALANCE (ac-ft)
---------------------------
+ Initial Vol  =        .000
+ HYG Vol IN   =        .660
- Infiltration =        .000
- HYG Vol OUT  =        .659
- Retained Vol =        .000
                  ----------
Unrouted Vol =       -.000 ac-ft  (.000% of Inflow Volume)
```

LEVEL POOL ROUTING SUMMARY

```
HYG Dir          = H:\Columbus\P\120161\Design\Storm Drainage\
Inflow  HYG file = NONE STORED - P-DETENTION  IN  2
Outflow HYG file = NONE STORED - P-DETENTION  OUT 2

Pond Node   Data = P-DETENTION
Pond Volume Data = P-DETENTION
Pond Outlet Data = Outlet 1

No Infiltration

INITIAL CONDITIONS
----------------------------------
Starting WS Elev   =   801.50 ft
Starting Volume    =     .000 ac-ft
Starting Outflow   =      .00 cfs
Starting Infiltr.  =      .00 cfs
Starting Total Qout=      .00 cfs
Time Increment     =    .0100 hrs


INFLOW/OUTFLOW HYDROGRAPH SUMMARY
=====================================================
Peak Inflow       =     14.30 cfs    at   12.0000 hrs
Peak Outflow      =      3.98 cfs    at   12.2000 hrs
-----------------------------------------------------
Peak Elevation    =    804.72 ft
Peak Storage =           .369 ac-ft
=====================================================


MASS BALANCE (ac-ft)
--------------------------
+ Initial Vol  =        .000
+ HYG Vol IN   =        .873
- Infiltration =        .000
- HYG Vol OUT  =        .873
- Retained Vol =        .000
                 ----------
Unrouted Vol =       -.000 ac-ft  (.001% of Inflow Volume)
```

LEVEL POOL ROUTING SUMMARY

```
HYG Dir          = H:\Columbus\P\120161\Design\Storm Drainage\
Inflow  HYG file = NONE STORED - P-DETENTION  IN  5
Outflow HYG file = NONE STORED - P-DETENTION  OUT 5

Pond Node   Data = P-DETENTION
Pond Volume Data = P-DETENTION
Pond Outlet Data = Outlet 1

No Infiltration

INITIAL CONDITIONS
----------------------------------
Starting WS Elev   =   801.50 ft
Starting Volume    =     .000 ac-ft
Starting Outflow   =      .00 cfs
Starting Infiltr.  =      .00 cfs
Starting Total Qout=      .00 cfs
Time Increment     =    .0100 hrs


INFLOW/OUTFLOW HYDROGRAPH SUMMARY
=====================================================
Peak Inflow       =     19.34 cfs    at   11.9800 hrs
Peak Outflow      =     10.30 cfs    at   12.1300 hrs
-----------------------------------------------------
Peak Elevation    =    805.13 ft
Peak Storage =           .453 ac-ft
=====================================================


MASS BALANCE (ac-ft)
---------------------------
+ Initial Vol  =        .000
+ HYG Vol IN   =       1.188
- Infiltration =        .000
- HYG Vol OUT  =       1.188
- Retained Vol =        .000
                  ----------
Unrouted Vol =       -.000 ac-ft  (.001% of Inflow Volume)
```

LEVEL POOL ROUTING SUMMARY

```
HYG Dir          = H:\Columbus\P\120161\Design\Storm Drainage\
Inflow  HYG file = NONE STORED - P-DETENTION  IN  10
Outflow HYG file = NONE STORED - P-DETENTION  OUT 10

Pond Node   Data = P-DETENTION
Pond Volume Data = P-DETENTION
Pond Outlet Data = Outlet 1

No Infiltration

INITIAL CONDITIONS
----------------------------------
Starting WS Elev   =   801.50 ft
Starting Volume    =     .000 ac-ft
Starting Outflow   =      .00 cfs
Starting Infiltr.  =      .00 cfs
Starting Total Qout=      .00 cfs
Time Increment     =    .0100 hrs


INFLOW/OUTFLOW HYDROGRAPH SUMMARY
=====================================================
Peak Inflow       =     23.53 cfs    at   11.9800 hrs
Peak Outflow      =     13.83 cfs    at   12.1100 hrs
-----------------------------------------------------
Peak Elevation    =    805.42 ft
Peak Storage =           .518 ac-ft
=====================================================


MASS BALANCE (ac-ft)
--------------------------
+ Initial Vol  =        .000
+ HYG Vol IN   =       1.454
- Infiltration =        .000
- HYG Vol OUT  =       1.454
- Retained Vol =        .000
                   ----------
Unrouted Vol =       -.000 ac-ft  (.000% of Inflow Volume)
```

LEVEL POOL ROUTING SUMMARY

```
HYG Dir          = H:\Columbus\P\120161\Design\Storm Drainage\
Inflow  HYG file = NONE STORED - P-DETENTION  IN  25
Outflow HYG file = NONE STORED - P-DETENTION  OUT 25

Pond Node   Data = P-DETENTION
Pond Volume Data = P-DETENTION
Pond Outlet Data = Outlet 1

No Infiltration

INITIAL CONDITIONS
----------------------------------
Starting WS Elev   =   801.50 ft
Starting Volume    =     .000 ac-ft
Starting Outflow   =      .00 cfs
Starting Infiltr.  =      .00 cfs
Starting Total Qout=      .00 cfs
Time Increment     =    .0100 hrs


INFLOW/OUTFLOW HYDROGRAPH SUMMARY
=====================================================
Peak Inflow       =     29.43 cfs    at   11.9800 hrs
Peak Outflow      =     17.05 cfs    at   12.1100 hrs
-----------------------------------------------------
Peak Elevation    =    805.83 ft
Peak Storage =           .613 ac-ft
=====================================================


MASS BALANCE (ac-ft)
---------------------------
+ Initial Vol  =        .000
+ HYG Vol IN   =       1.835
- Infiltration =        .000
- HYG Vol OUT  =       1.835
- Retained Vol =        .000
                  ----------
Unrouted Vol =        .000 ac-ft  (.003% of Outflow Volume)
```

LEVEL POOL ROUTING SUMMARY

```
HYG Dir          = H:\Columbus\P\120161\Design\Storm Drainage\
Inflow  HYG file = NONE STORED - P-DETENTION  IN  50
Outflow HYG file = NONE STORED - P-DETENTION  OUT 50

Pond Node   Data = P-DETENTION
Pond Volume Data = P-DETENTION
Pond Outlet Data = Outlet 1

No Infiltration

INITIAL CONDITIONS
----------------------------------
Starting WS Elev   =   801.50 ft
Starting Volume    =     .000 ac-ft
Starting Outflow   =      .00 cfs
Starting Infiltr.  =      .00 cfs
Starting Total Qout=      .00 cfs
Time Increment     =    .0100 hrs


INFLOW/OUTFLOW HYDROGRAPH SUMMARY
=====================================================
Peak Inflow       =     34.31 cfs    at   11.9800 hrs
Peak Outflow      =     17.97 cfs    at   12.1200 hrs
-----------------------------------------------------
Peak Elevation    =    806.20 ft
Peak Storage =           .703 ac-ft
=====================================================


MASS BALANCE (ac-ft)
---------------------------
+ Initial Vol  =        .000
+ HYG Vol IN   =       2.155
- Infiltration =        .000
- HYG Vol OUT  =       2.155
- Retained Vol =        .000
                  ----------
Unrouted Vol =        .000 ac-ft  (.003% of Outflow Volume)
```

LEVEL POOL ROUTING SUMMARY

```
HYG Dir          = H:\Columbus\P\120161\Design\Storm Drainage\
Inflow  HYG file = NONE STORED - P-DETENTION  IN  100
Outflow HYG file = NONE STORED - P-DETENTION  OUT 100

Pond Node   Data = P-DETENTION
Pond Volume Data = P-DETENTION
Pond Outlet Data = Outlet 1

No Infiltration

INITIAL CONDITIONS
----------------------------------
Starting WS Elev   =   801.50 ft
Starting Volume    =     .000 ac-ft
Starting Outflow   =      .00 cfs
Starting Infiltr.  =      .00 cfs
Starting Total Qout=      .00 cfs
Time Increment     =    .0100 hrs


INFLOW/OUTFLOW HYDROGRAPH SUMMARY
=====================================================
Peak Inflow       =     39.44 cfs    at   11.9800 hrs
Peak Outflow      =     18.90 cfs    at   12.1300 hrs
-----------------------------------------------------
Peak Elevation    =    806.59 ft
Peak Storage =           .805 ac-ft
=====================================================


MASS BALANCE (ac-ft)
---------------------------
+ Initial Vol  =        .000
+ HYG Vol IN   =       2.495
- Infiltration =        .000
- HYG Vol OUT  =       2.495
- Retained Vol =        .000
                  ----------
Unrouted Vol =        .000 ac-ft  (.002% of Outflow Volume)
```

Index of Starting Page Numbers for ID Names

----- C -----
CITY OF COLUMBUS... 2.01

----- O -----
Outlet 1... 7.01

----- P -----
P-DETENTION... 6.01, 8.01, 8.02,
8.03, 8.04, 8.05, 8.06, 8.07
POST-DETAINED... 3.01, 4.01, 5.01,
5.02, 5.03, 5.04, 5.05, 5.06,
5.07
POST-UNDETAINED... 3.03, 4.02, 5.08,
5.09, 5.10, 5.11, 5.12, 5.13,
5.14
PRE-DETAINED... 3.05, 4.03, 5.15,
5.16, 5.17, 5.18, 5.19, 5.20,
5.21
PRE-UNDETAINED... 3.07, 4.04, 5.22,
5.23, 5.24, 5.25, 5.26, 5.27,
5.28

----- W -----
Watershed... 1.01

Hydrologic Soil Group—Franklin County, Ohio
(Highland Park Elementary)

Map Scale: 1:2,450 if printed on A size (8.5" x 11") sheet.

N

Meters: 0 30 60 120 180

Feet: 0 100 200 400 600

MAP LEGEND

Area of Interest (AOI)

Area of Interest (AOI)

Soils

Soil Map Units

Soil Ratings

A

A/D

B

B/D

C

C/D

D

Not rated or not available

Political Features

Cities

Water Features

Streams and Canals

Transportation

Rails

Interstate Highways

US Routes

Major Roads

Local Roads

MAP INFORMATION

Map Scale: 1:2,450 if printed on A size (8.5" × 11") sheet.

The soil surveys that comprise your AOI were mapped at 1:15,840.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for accurate map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL: http://websoilsurvey.nrcs.usda.gov
Coordinate System: UTM Zone 17N NAD83

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Franklin County, Ohio
Survey Area Data: Version 10, Mar 16, 2012

Date(s) aerial images were photographed: 6/23/2004

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Hydrologic Soil Group

Hydrologic Soil Group— Summary by Map Unit — Franklin County, Ohio (OH049)				
Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
CfB	Celina-Urban land complex, 2 to 6 percent slopes	C	7.2	34.5%
CsB	Crosby-Urban land complex, 2 to 6 percent slopes	C/D	2.0	9.6%
Mh	Medway silt loam, occasionally flooded	C	6.1	29.1%
MIC2	Miamian silty clay loam, 6 to 12 percent slopes, eroded	C	4.6	21.8%
MnC	Miamian-Urban land complex, 6 to 12 percent slopes	C	1.0	5.0%
Totals for Area of Interest			**20.9**	**100.0%**

Description

Hydrologic soil groups are based on estimates of runoff potential. Soils are assigned to one of four groups according to the rate of water infiltration when the soils are not protected by vegetation, are thoroughly wet, and receive precipitation from long-duration storms.

The soils in the United States are assigned to four groups (A, B, C, and D) and three dual classes (A/D, B/D, and C/D). The groups are defined as follows:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

If a soil is assigned to a dual hydrologic group (A/D, B/D, or C/D), the first letter is for drained areas and the second is for undrained areas. Only the soils that in their natural condition are in group D are assigned to dual classes.

Rating Options

Aggregation Method: All Components

Aggregation is the process by which a set of component attribute values is reduced to a single value that represents the map unit as a whole.

A map unit is typically composed of one or more "components". A component is either some type of soil or some nonsoil entity, e.g., rock outcrop. For the attribute being aggregated, the first step of the aggregation process is to derive one attribute value for each of a map unit's components. From this set of component attributes, the next step of the aggregation process derives a single value that represents the map unit as a whole. Once a single value for each map unit is derived, a thematic map for soil map units can be rendered. Aggregation must be done because, on any soil map, map units are delineated but components are not.

For each of a map unit's components, a corresponding percent composition is recorded. A percent composition of 60 indicates that the corresponding component typically makes up approximately 60% of the map unit. Percent composition is a critical factor in some, but not all, aggregation methods.

The aggregation method "All Components" returns the lowest or highest attribute value among all components of the map unit, depending on the corresponding "tie-break" rule. In this case, the "tie-break" rule indicates whether the lowest or highest value among all components should be returned. For this aggregation method, percent composition ties cannot occur.

The result returned by this aggregation method represents either the minimum or maximum value of the corresponding attribute throughout the map unit. The result may well be based on a map unit component of very minor extent.

Component Percent Cutoff: None Specified

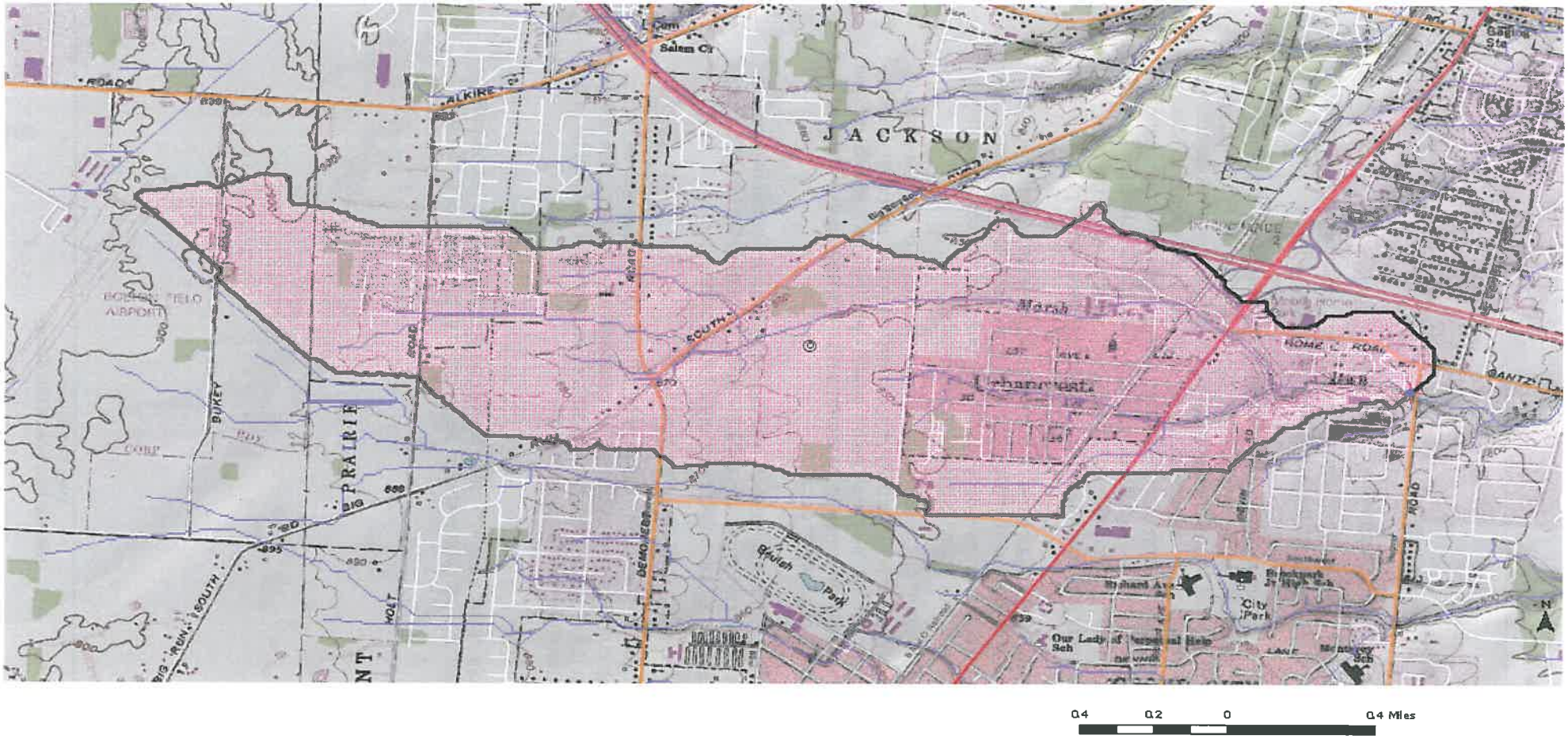
Components whose percent composition is below the cutoff value will not be considered. If no cutoff value is specified, all components in the database will be considered. The data for some contrasting soils of minor extent may not be in the database, and therefore are not considered.

Tie-break Rule: Higher

The tie-break rule indicates which value should be selected from a set of multiple candidate values, or which value should be selected in the event of a percent composition tie.

USGS
Ohio StreamStats

StreamStats Print Page



Explanation

- NHDHGage2
- NHDHDam2
- GlobalWatershedPoint
- Centroid
- Slp1085Point
- LongestFlowPath3D
- Gaging Station, Continuous Record
- Low Flow, Partial Record
- Peak Flow, Partial Record
- Peak and Low Flow, Partial Record
- Stage Only
- Low Flow, Partial Record, Stage
- Miscellaneous Record

- StreamCells
- GlobalWatershed
- ExcludePoly
- Miscellaneous Record
- Unknown

USGS
Ohio StreamStats

Basin Characteristics Report

Date: Thu Mar 28 2013 08:19:28 Mountain Daylight Time
NAD27 Latitude: 39.8983 (39 53 54)
NAD27 Longitude: -83.0688 (-83 04 08)
NAD83 Latitude: 39.8984 (39 53 54)
NAD83 Longitude: -83.0687 (-83 04 07)

Parameter	Value
Region A indicator for Ohio Peak Flows	1
Region C indicator for Ohio Peak Flows	0
Area in square miles	2.02
Y coordinate (latitude) of the centroid, in decimal degrees	39.9000
10-85 slope, in feet per mile	30.9
X coordinate (longitude) of the centroid, in decimal degrees	83.0993
Mean annual precipitation at basin centroid, in inches	37.8
Streamflow variability index at the outlet	0.613
Area Covered by forest, in percent	11.4
Area Covered by water and wetlands, in percent	0.37

WQv CALCULATOR - 5/22/2014
H:\Columbus\P\120161\Design\Storm Drainage\120161 WQ_2014-05-22.txt

Project Number: 120161
Project Name: Highland Park ES
Description:
Date: 5/22/2014
Designed By: MSM
Checked By:

Detention Description: Dry Basin

Development Type: Single Family Residential, TND

WQv RESULTS

Calculated WQv: 0.166 ac ft
Add 20% for Dry Detention: 0.033 ac ft
Total WQv Required: 0.199 ac ft

Elev Equal to 100% WQv: 803.55 ft
100% WQv Drawdown: 62.92 hrs

Elev Equal to 50% WQv: 803.09 ft
50% WQv Drawdown: 41.00 hrs

Total Pond Drawdown: 182.92 hrs

WATERSHED DATA

Watershed Area: 6.99 ac
Runoff Coefficient: .38
Rainfall Depth: .75 in

OUTLET DATA

Elev (ft)	Dia (ft)	Number
801.5	0.09375	1

BASIN DATA

Elev (ft)	Area (sq ft)
801.5	2
802	638
803	6385
807	12372

100% WQv DRAWDOWN

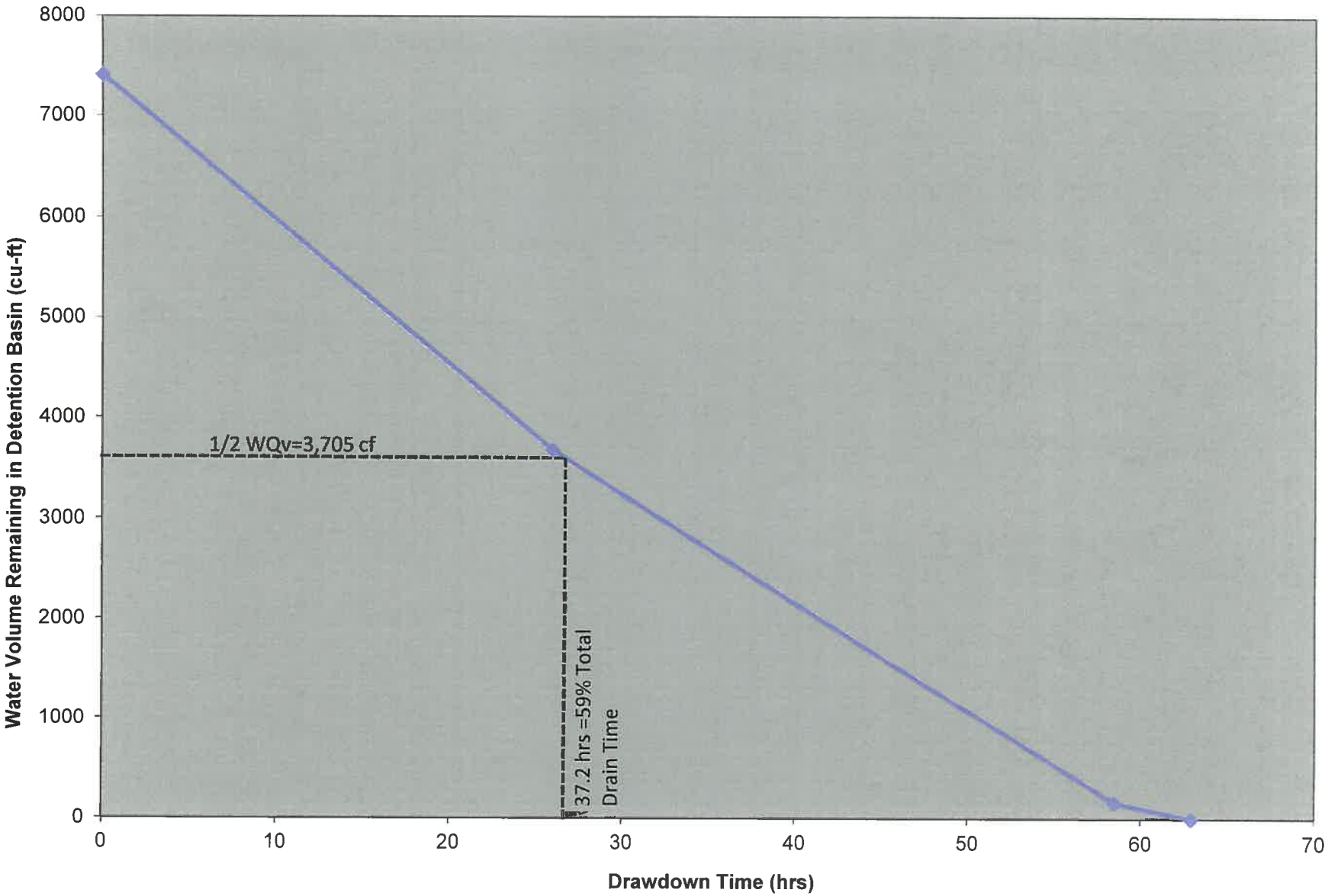
Elev (ft)	Area (ft2)	dVol (ft3)	Qavg (ft3/s)	dt (hr)
801.5	2	160	0.01	4.44
802	638	3512	0.03	32.52
803	6385	3738	0.04	25.96
803.55	7208.21			

50% WQv DRAWDOWN

Elev (ft)	Area (ft2)	dVol (ft3)	Qavg (ft3/s)	dt (hr)
801.5	2	160	0.01	4.44
802	638	3512	0.03	32.52
803	6385	581	0.04	4.03
803.09	6519.71			

TOTAL BASIN DRAWDOWN

Elev (ft)	Area (ft2)	dVol (ft3)	Qavg (ft3/s)	dt (hr)
801.5	2	160	0.01	4.44
802	638	3512	0.03	32.52
803	6385	31527	0.06	145.96
807	12372			


8000
7000
6000
5000
4000
3000
2000
1000
0
Water Volume Remaining in Detention Basin (cu-ft)
1/2 WQv=3,705 cf
37.2 hrs =59% Total
Drain Time
0
10
20
30
40
50
60
70
Drawdown Time (hrs)