CONSTRUCTION PLANS FOR WESTFIELD HIGH SCHOOL ADDITION

OWNER:

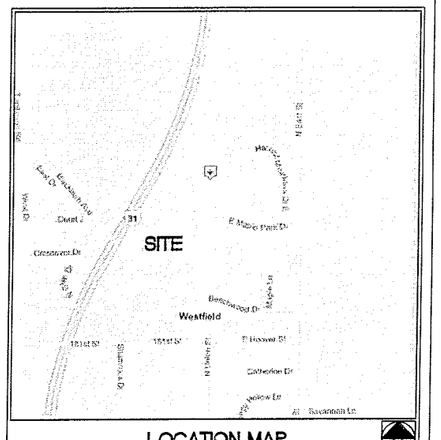
WESTFIELD WASHINGTON SCHOOLS
322 WEST MAIN ST
WESTFIELD, IN 46074
CONTACT: NICK VERHOFF
Ph. (317) 867-8013

ENGINEER:

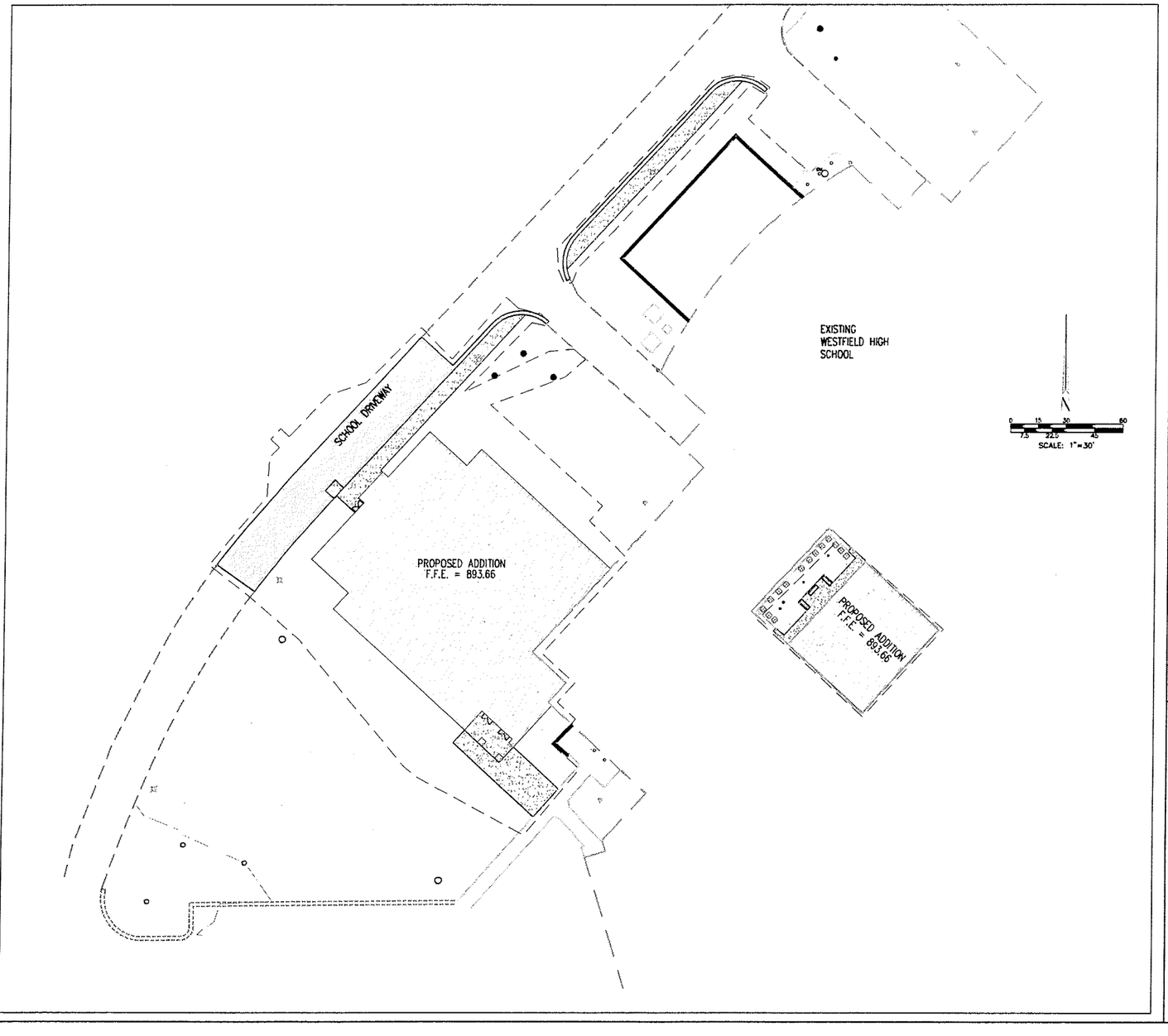
Cripe
Architects + Engineers
Solutions by Design Since 1957
3939 PRIORITY WAY SOUTH DRIVE, SUITE 400
INDIANAPOLIS, INDIANA 46240
(317) 844-6777 FAX (317) 706-6464

ARCHITECT:

CSO Architects
ARCHITECTURE • INTERIOR DESIGN
280 EAST 96TH STREET, SUITE 100
INDIANAPOLIS, INDIANA 46240
(317) 848-7800 FAX (317) 574-0957



LOCATION MAP
NOT TO SCALE



PROJECT DATA

Project Address:	18250 UNION STREET
Project Area:	39,155 SF DISTURBED AREA
Building Area:	14,455 SF BUILDING ADDITION
	3,225 SF COURTYARD ADDITION
	17,680 SF TOTAL

INDEX

SHT	DESCRIPTION
CS	COVER SHEET
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BENCHMARKS

REFERENCE BENCHMARK: NGS STANDARD BENCHMARK DISK (STAMPED "D 112 1945") SET IN THE TOP OF A CONCRETE POST LOCATED ON THE NORTH SIDE OF STATE HIGHWAY 32 APPROXIMATELY 2.25 MILES WEST OF WESTFIELD HIGH SCHOOL, 1.0 MILE EAST OF THE CROSS ROAD AT EAGLE TOWN, 0.25 MILES EAST OF THE JUNCTION WITH A ROAD LEADING NORTH, AND 24 FEET NORTH OF THE CENTERLINE OF THE HIGHWAY.

ELEV.=924.61 (NGVD 1929)

SITE T.B.M. #1: MAG NAIL DRILLED INTO THE TOP OF A 2 FOOT DIAMETER, 3 FOOT TALL CONCRETE LIGHT POLE BASE LOCATED IN THE HIGH SCHOOL PARKING LOT, 128 FEET NORTHEAST OF THE NORTHEAST CORNER OF THE HIGH SCHOOL BUILDING.

ELEV.=892.91 (NGVD 1929)

SITE T.B.M. #2: MAG NAIL DRILLED INTO THE TOP OF A 2 FOOT DIAMETER, 3 FOOT TALL CONCRETE LIGHT POLE BASE LOCATED AT THE NORTHWEST CORNER OF THE INTERSECTION OF THE FIRST SOUTH ENTRANCE DRIVE OF THE HIGH SCHOOL WEST OF UNION STREET AND HOOVER ROAD.

ELEV.=894.23 (NGVD 1929)

UTILITY AND AGENCY CONTACT INFORMATION

UTILITY/ AGENCY	PHONE NO
WESTFIELD PUBLIC WORKS	317-896-5452
WESTFIELD FIRE DEPT.	317-896-2704
WESTFIELD COMMUNITY DEVELOPMENT	317-896-5577
HAMILTON COUNTY SURVEYOR	317-776-8495
CITIZENS GAS OF WESTFIELD	317-927-4684
DUKE ENERGY	317-896-6711

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CAUTION

LOCATIONS OF ALL EXISTING UNDERGROUND UTILITIES SHOWN ON THIS PLAN ARE BASED UPON ABOVE GROUND EVIDENCE (including, but not limited to, manholes, inlets, valves, and marks made upon the ground by others) AND ARE SPECULATIVE IN NATURE. THERE MAY ALSO BE OTHER EXISTING UNDERGROUND UTILITIES FOR WHICH THERE IS NO ABOVE GROUND EVIDENCE OR FOR WHICH NO ABOVE GROUND EVIDENCE WAS OBSERVED. THE EXACT LOCATIONS OF SAID EXISTING UNDERGROUND UTILITIES SHOULD BE VERIFIED BY THE CONTRACTOR PRIOR TO ANY AND ALL CONSTRUCTION.

CRIPE TEAM

		PHONE NO.
PROJECT MGR	GRAHAM LEWIS	317-706-6365
PROJECT ENGR	JOHN NIERZWICKI, E.I.	317-706-6350
PROJECT SURVEYOR	MATT QUILLEN	317-706-6319
QUALITY ASSURANCE	DAVID LACH, P.E.	317-706-6361

Revisions			
Mark	Date	Description	

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- GIS
- OWNERS REPRESENTATION

COVER SHEET
WESTFIELD HIGH SCHOOL ADDITION
WESTFIELD WASHINGTON SCHOOLS
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WESTFIELD, IN 46074

CERTIFIED BY:

DAVID A. LACH REGISTERED PE 10000126 STATE OF INDIANA PROFESSIONAL ENGINEER

Date 02-06--09

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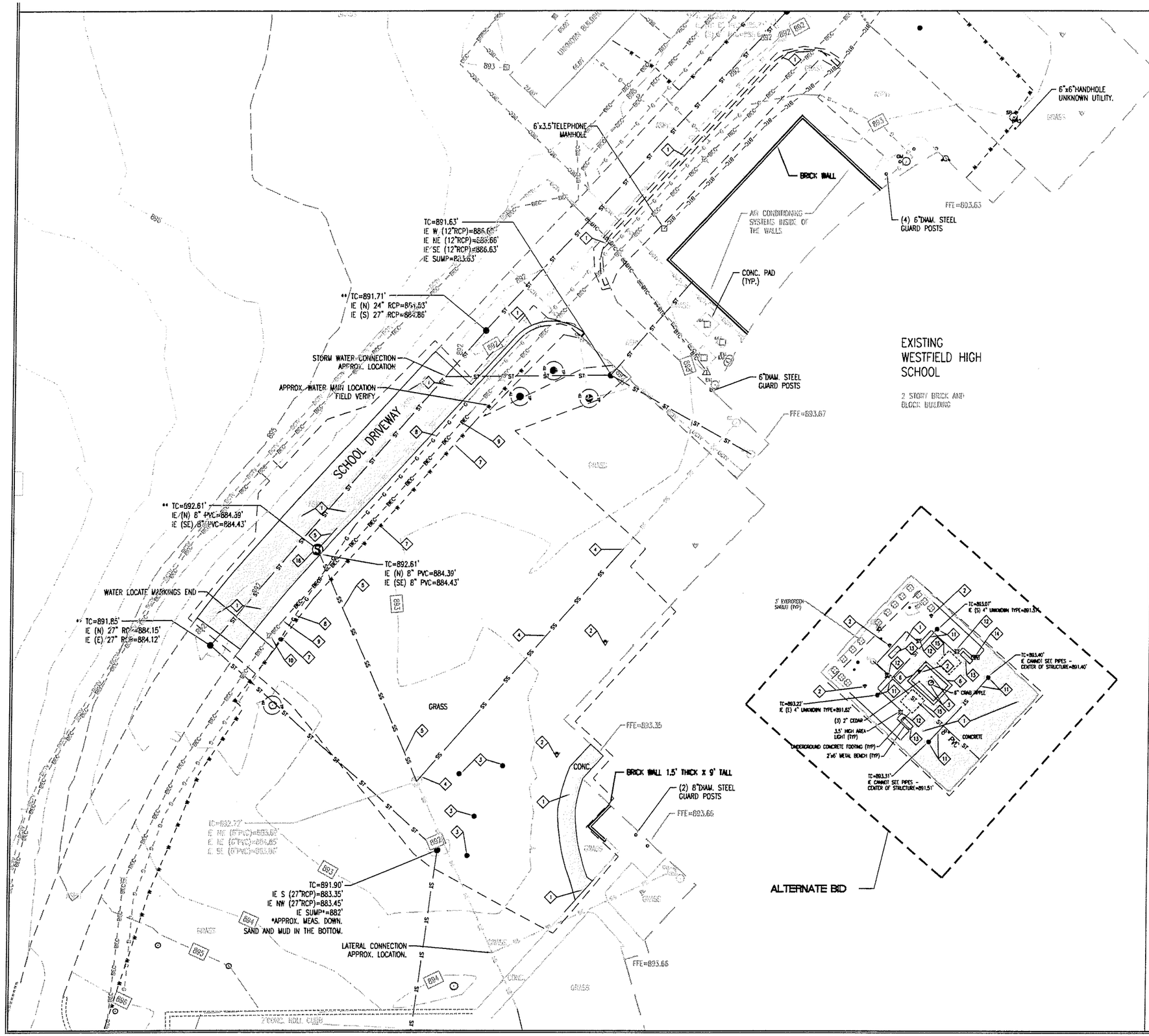

EXISTING FEATURES LEGEND

SANITARY SEWER & MANHOLE	POWER POLE
STORM SEWER; END SECTION, INLET & M.H.	GUY WIRE
GAS LINE	TELEPHONE RISER
WATER LINE	UTILITY RISER; ELEC. & CTV
ELECTRIC LINE (AERIAL)	ELECTRIC TRANSFORMER
TELEPHONE LINE (AERIAL)	STREET LIGHT
CABLE TELEVISION (AERIAL)	LIGHT POLE
BURIED TELE. CABLE	FLOOD LIGHT
BURIED ELEC. CABLE	TRAFFIC SIGNAL
FENCE LINE (TYP.)	FIRE HYDRANT
BURIED CABLE TV	VALVE; GAS & WATER
GUARDRAIL	STREET SIGN
RIGHT OF WAY LINE	ELECTRIC MANHOLE
EASEMENT LINE	TELEPHONE MANHOLE
CENTER LINE	SEWER CLEANOUT
SIMILE LINE	WATER METER
D. DEED DIMENSION	GAS METER
M. MEASURED DIMENSION	ELECTRIC METER
P. PLAT DIMENSION	PIPELINE MARKER POST
R. RADIUS	PIPELINE PATROL PLANE MARKER
L. ARC LENGTH	PIPELINE CASING VENT
FND. FOUND	PIPELINE TEST STATION
DENOTES A 5/8" DIA. REBAR WITH YELLOW PLASTIC CAP SET. CAP STAMPED "P.L. CRIPE FIRM NO. 0055" UNLESS OTHERWISE NOTED.	MAILBOX
	SPRINKLER HEAD
	SPOT GRADE
	TC TOP OF CASTING ELEVATION
	IE INVERT ELEVATION

LEGEND
PROPOSED DEMOLITION

EXISTING TO BE DEMOLISHED

TREE PRESERVATION —— TP —— TP ——

CONSTRUCTION LIMITS — — — — —

REFERENCE BENCHMARK: NGS STANDARD BENCHMARK DISK (STAMPED "B 112 1946") SET IN THE TOP OF A CONCRETE POST LOCATED ON THE NORTH SIDE OF STATE HIGHWAY 32 APPROXIMATELY 2.25 MILES WEST OF WESTFIELD HIGH SCHOOL, 1.0 MILE EAST OF THE CROSS ROAD AT EAGLE ROAD, 0.25 MILES EAST OF THE JUNCTION WITH A ROAD LEADING NORTH, AND 24 FEET NORTH OF THE CENTERLINE OF THE HIGHWAY.

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ELEV.=894.23 (NGVD 1929)

GENERAL DEMOLITION PLAN NOTES

1. THE CONTRACTOR SHALL VERIFY EXISTING UTILITY LOCATIONS PRIOR TO BEGINNING EXCAVATION OPERATIONS.
2. THE CONTRACTOR SHALL COORDINATE ALL WORK ASSOCIATED WITH THE REMOVAL, RELOCATION, AND DEMOLITION OF EXISTING UTILITIES WITH THE RESPECTIVE UTILITY COMPANY.
3. ALL DEMOLISHED MATERIAL TO BECOME THE PROPERTY OF THE CONTRACTOR UNLESS OTHERWISE NOTED, AND SHALL BE LEGALLY DISPOSED OF OFF-SITE.
4. CONTRACTOR SHALL INSTALL PROTECTIVE FENCING AT DRIPLINE TO PRESERVE EXISTING TREES
5. MAINTAIN PROPER DRAINAGE IN DEMOLITION AREAS.
6. SAW CUT EXISTING CONCRETE AND ASPHALT SURFACES FOR REMOVAL AS NOTED.
7. REMOVE AND RELOCATE WATER MAIN (SEE UTILITY PLAN)
8. REMOVE AND RELOCATE GAS MAIN. COORDINATE WITH UTILITY COMPANY (SEE UTILITY PLAN)
9. EXISTING WATER LINES SHALL NOT BE ABANDONED OR DEMOLISHED UNTIL PROPOSED WATER MAINS HAVE BEEN INSTALLED TO A POINT SUCH THAT ONLY MINIMAL DISRUPTION IN WATER SERVICE TO THE EXISTING OCCUPIED BUILDINGS WILL OCCUR.
10. ANY DISCREPANCIES OR CONFLICTS WHICH BECOME APPARENT BEFORE OR DURING CONSTRUCTION SHALL BE BROUGHT TO THE ATTENTION OF THE DESIGN ENGINEER PRIOR TO CONSTRUCTION SO THAT CLARIFICATION OR REDESIGN MAY OCCUR.

DEMOLITION KEY NOTES

1. SAWCUT AND REMOVE CONCRETE/ASPHALT PAVEMENT.
2. REMOVE GROUND LIGHT AND FOUNDATION
3. REMOVE TREE AND ROOT BALL
4. REMOVE 6" PVC SANITARY LATERAL AND PLUG AND SEAL AT MANHOLE
5. REMOVE 8" PVC SANITARY MAIN. COORDINATE LINE REPLACEMENT FOR SEWER SERVICE INTERRUPTION
6. REMOVE CONCRETE BLOCK SEAT WALL.
7. REMOVE AND RELOCATE WATER MAIN (SEE UTILITY PLAN) COORDINATE LINE REPLACEMENT FOR WATER SERVICE INTERRUPTION
8. REMOVE AND RELOCATE GAS MAIN. COORDINATE WITH UTILITY COMPANY. (SEE UTILITY PLAN)
9. REMOVE AND RELOCATE BURIED ELECTRIC. COORDINATE WITH UTILITY COMPANY. (SEE UTILITY PLAN)
10. REMOVE LIGHT POLE AND REINSTALL AFTER UTILITIES ARE RE-ROUTED. (SEE ELECTRICAL PLAN)
11. REMOVE STORM STRUCTURE AND PIPING
12. REMOVE LIGHT BOLLARD AND FOUNDATION. LIGHT BOLLARD TO BE RETURNED TO OWNER. COORDINATE STORAGE LOCATION.
13. REMOVE BENCH AND STORE FOR REUSE. (SEE SITE PLAN FOR NEW LOCATION)
14. REMOVE IRRIGATION LINES AND CONTROLS. COORDINATE RECONNECTION WITH NEW PLAN.
15. VERIFY LOCATION AND REMOVE BELOW GRADE CONCRETE FOOTING
16. REMOVE SANITARY MANHOLE. RE-USE CASTING IF CONFORMS TO CURRENT WESTFIELD STANDARDS (SEE C502 FOR CASTING INFORMATION)

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CAUTION

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Revisions		
Item	Date	Description

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EXISTING CONDITIONS AND DEMOLITION PLAN
WESTFIELD HIGH SCHOOL ADDITION
WESTFIELD WASHINGTON SCHOOLS
322 WEST MAIN STREET
WESTFIELD, IN 46074

CERTIFIED BY:

DAVID A. LACH
REGISTERED
PE 10006126
STATE OF INDIANA
PROFESSIONAL ENGINEER

Date 02-06-09

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DESIGN

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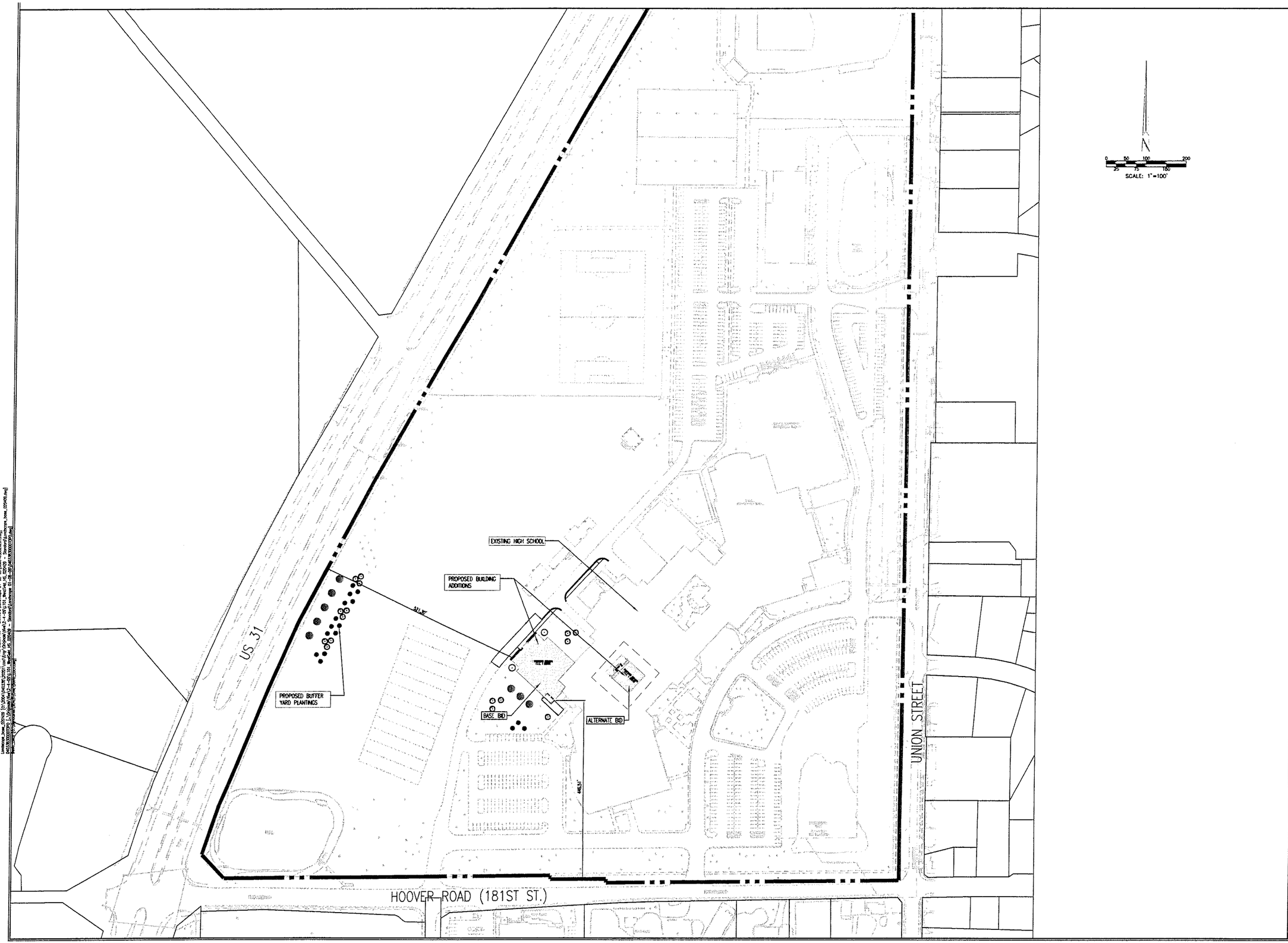

Revisions

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OVERALL SITE PLAN

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WESTFIELD WASHINGTON SCHOOLS
322 WEST MAIN STREET
WESTFIELD, IN 46074

CERTIFIED BY:

DAVID A. LASCH REGISTERED PE 10000126 STATE OF INDIANA PROFESSIONAL ENGINEER

Date: 02-06-09

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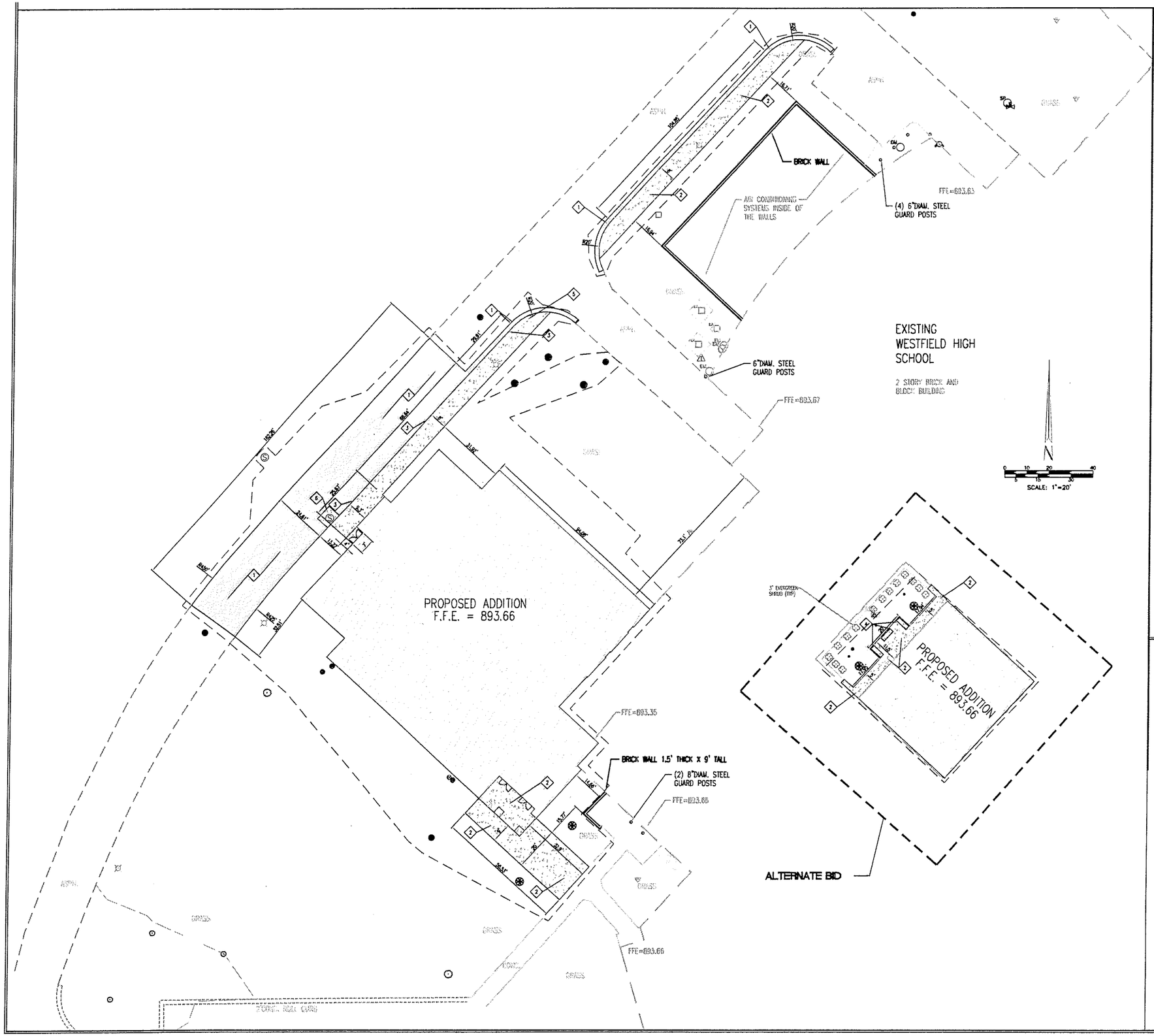

SITE PLAN LEGEND

PROPOSED CONSTRUCTION

BOUNDARY LINE
BUILDING SETBACK LINE
EASEMENT LINE
RIGHT-OF-WAY
CENTERLINE
FENCE
GUARD RAIL

SITE WORK GENERAL NOTES AND SPECIFICATIONS

NOTICES AND PERMITS

1. THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING, OR VERIFYING, THAT ALL PERMITS AND APPROVALS ARE OBTAINED FROM THE RESPECTIVE CITY, COUNTY AND STATE AGENCIES PRIOR TO STARTING CONSTRUCTION.

2. IT SHALL BE THE CONTRACTORS RESPONSIBILITY TO DETERMINE THE EXACT LOCATION OF ALL EXISTING UTILITIES IN THE VICINITY OF THE CONSTRUCTION AREA PRIOR TO STARTING CONSTRUCTION.

3. IT SHALL BE THE CONTRACTORS RESPONSIBILITY FOR NOTIFICATION AND COORDINATION OF ALL CONSTRUCTION WITH RESPECTIVE UTILITY COMPANIES.

4. IT SHALL BE THE RESPONSIBILITY OF THE DEVELOPER AND CONTRACTOR TO MAINTAIN QUALITY CONTROL THROUGHOUT THE PROJECT; FAILURE TO DO SO MAY RESULT IN REMOVAL AND REPLACEMENT OF THE DEFECTIVE WORK.

5. IT IS ESSENTIAL THAT THE WORK TO BE DONE IN CONJUNCTION WITH THIS PROJECT SHALL BE INSTALLED ACCORDING TO THESE SPECIFICATIONS. THE ENGINEER WILL BE REQUIRED TO CERTIFY TO CERTAIN PORTIONS OF THIS PROJECT UPON COMPLETION. THEREFORE, IT IS NECESSARY TO OBTAIN APPROVAL AND ACCEPTANCE BY THE CITY THAT CONSTRUCTION WAS DONE IN COMPLIANCE WITH THESE PLANS AND SPECIFICATIONS.

6. ALL QUANTITIES GIVEN ON THE PRINTS, VERBALLY OR IN THE SCOPE OF WORK SECTION ARE ESTIMATES AND SHALL BE CONFIRMED BY THE BIDDING CONTRACTOR.

7. OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION (OSHA) STANDARDS FOR EXCAVATIONS. FINAL RULE 29 CFR PART 1926, SUBPART "P" APPLIES TO ALL EXCAVATIONS EXCEEDING FIVE (5) FEET IN DEPTH.

8. EXCAVATIONS EXCEEDING TWENTY (20) FEET IN DEPTH REQUIRE THE DESIGN OF A TRENCH SAFETY SYSTEM BY A REGISTERED PROFESSIONAL ENGINEER.

SITE PLAN NOTES

1. ALL WADN AND STREET DIMENSIONS SHALL BE MEASURED TO BACK OF CURB OR FACE OF COMBINED WALK AND CURB. ALL DIMENSIONS TO THE BUILDING ARE TO THE OUTSIDE OF BUILDING FOUNDATION WALL.

2. ALL PAVEMENT AND/OR CURB WADN TO BE FIVE (5) FOOT UNLESS OTHERWISE NOTED.

3. BEARINGS, DIMENSIONS AND EASEMENTS ARE SHOWN FOR REFERENCE ONLY. SEE RECORD SURVEYS AND PLATS FOR EXACT INFORMATION.

4. SEE ARCHITECTURAL PLANS FOR DETAILS OF BUILDINGS AND BUILDING DIMENSIONS.

5. ALL PARKING AREAS TO BE CURBED WITH CHARBACK CURB OR INTEGRAL CURB AND WALK AS SHOWN.

6. TEMPORARY TRAFFIC CONTROL DURING CONSTRUCTION TO CONFORM TO APPLICABLE LOCAL STANDARDS.

7. SEE UTILITY PLAN FOR SANITARY AND STORM STRUCTURE LOCATIONS.

8. ANY DISCREPANCIES OR CONFLICTS WHICH BECOME APPARENT BEFORE OR DURING CONSTRUCTION SHALL BE BROUGHT TO THE ATTENTION OF THE DESIGN ENGINEER PRIOR TO CONSTRUCTION SO THAT CLARIFICATION OR REDESIGN MAY OCCUR.

KEYNOTE LEGEND

1. HEAVY DUTY ASPHALT PAVEMENT (SEE DETAIL PV-36A ON SHEET C202)
2. CONCRETE SIDEWALK (SEE DETAIL PV-16 ON SHEET C202)
3. COMBINED WALK AND CURB (SEE DETAIL PV-6 ON SHEET C202)
4. RELOCATED METAL BENCHES
5. ACCESSIBLE CURB RAMP (SEE DETAIL PV-10B ON SHEET C202)
6. CONCRETE COLLAR (SEE DETAIL PV-43 ON SHEET C202)

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Revisions			
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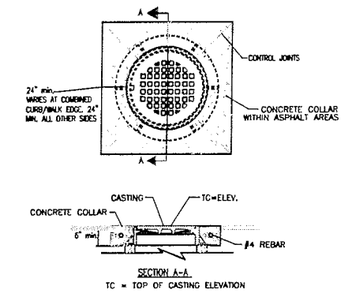
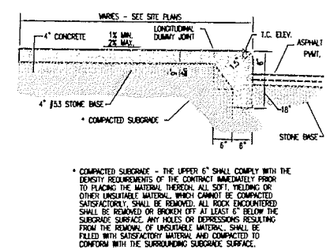


PV-43 CONCRETE COLLAR DETAIL

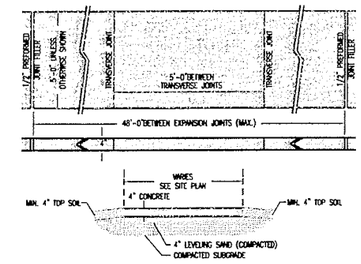
NO SCALE



* COMPACTED SUBGRADE - THE UPPER 6" SHALL COMPLY WITH THE DENSITY REQUIREMENTS OF THE CONTRACT IMMEDIATELY PRIOR TO PLACING THE MATERIAL THEREON. ALL SOFT, YIELDING OR OTHER UNSUITABLE MATERIAL, WHICH CANNOT BE COMPACTED SATISFACTORILY, SHALL BE REMOVED. ALL ROCK ENCOUNTERED SHALL BE REMOVED OR BROKEN OFF AT LEAST 6" BELOW THE SUBGRADE SURFACE. ANY HOLES OR DEPRESSIONS RESULTING FROM THE REMOVAL OF UNSUITABLE MATERIAL SHALL BE FILLED WITH SATISFACTORY MATERIAL AND COMPACTED TO CONFORM WITH THE SURROUNDING SUBGRADE SURFACE.

PV-6 COMBINED WALK AND CURB DETAIL

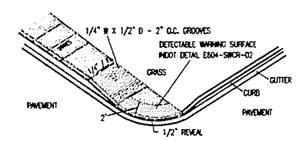
NO SCALE



PV-16 SIDEWALK DETAIL

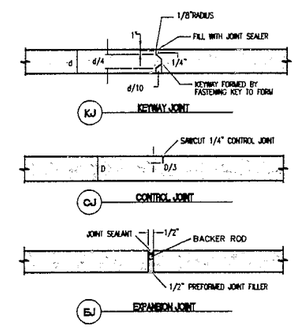
NO SCALE

NOTES:
1. CURB RAMPS SLOPE SHALL BE 1:12
2. FLARED SIDE SLOPE SHALL BE 1:10
3. SURFACE SHALL CONTRAST VISUALLY WITH ADJOINING SURFACE



PV-10B A.D.A. CURB RAMP DETAIL

NO SCALE



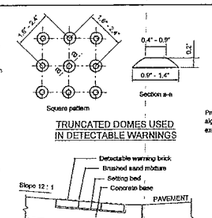
NOTE: PROVIDE WHERE SHOWN ON PLANS AND WHERE PAVEMENT ABUTS A VERTICAL SURFACE, BUILDING FOUNDATION, EXISTING OR PROPOSED PAVEMENTS, CURBS AND WALKS.

PV-26 CONCRETE JOINT DETAILS

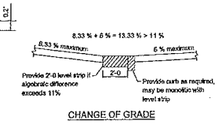
NO SCALE

GENERAL NOTES:

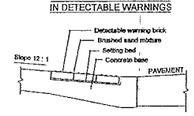
1. These dimensions are based on a 6 in. curb height. They shall be proportionally adjusted for other curb heights.
2. Where site infeasibility precludes construction to the width shown, such width may be decreased to a minimum of 3'-0.
3. The bottom edge of the curb ramp shall be flush with the edge of adjacent pavement and gutter line.
4. Landing areas at the top of curb ramps shall have maximum cross slope of 50 : 1 in any direction. When site infeasibility precludes a landing slope of 50 : 1 in any direction, the slope perpendicular to the curb face shall not exceed 50 : 1.
5. If site infeasibility precludes construction to the width shown, the landing width may be decreased to 3'-0 minimum. The running slope of the curb ramp may be steepened to a maximum of 10 : 1 for a maximum 6 in. rise.
6. Drainage inlets should be located uphill from curb ramps to prevent puddles at the path of travel.
7. See Standard Drawing E 604-SWCR-12 for improved access on narrow sidewalks.
8. Algebraic difference in grade between the base of curb ramp and the gutter shall be limited to less than 11%. If it is not practical, a 2'-0 wide level strip shall be provided. See detail sketch.



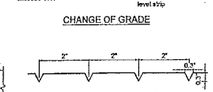
TRUNCATED DOMES USED IN DETECTABLE WARNINGS



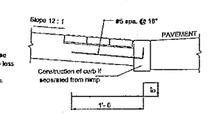
CHANGE OF GRADE



BRICK SURFACE CONSTRUCTION

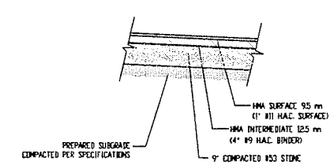


DETAIL OF RAMP GROOVES



ALTERNATE CURB CONSTRUCTION

INDIANA DEPARTMENT OF TRANSPORTATION
SIDEWALK CURB RAMPS
GENERAL NOTES & DETAILS
SEPTEMBER 2001
STANDARD DRAWING NO. E 604-SWCR-02



PV-96A ASPHALT PAVEMENT SECTIONS

NO SCALE

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GIS
CONSTRUCTION ADMINISTRATION

Revisions		
Mark	Date	Description

SITE DETAILS
WESTFIELD HIGH SCHOOL ADDITION
WESTFIELD WASHINGTON SCHOOLS
322 WEST MAIN STREET
WESTFIELD, IN 46074

CERTIFIED BY:

DAVID A. LACY REGISTERED PE 10000126 STATE OF INDIANA PROFESSIONAL ENGINEER

Date 02-06-09

COVERING

DESIGN

"KNOW BEFORE YOU DIG"
1-800-382-5544
OUL 811 INFO
1-800-428-0200
FOR CALLS BEFORE OF INDIANA

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Checked By: —
Quality Assurance: —
Scale: Scale: 1" = 1M

Sheet C202
Date 02-06-09
Project Number 040338-20201

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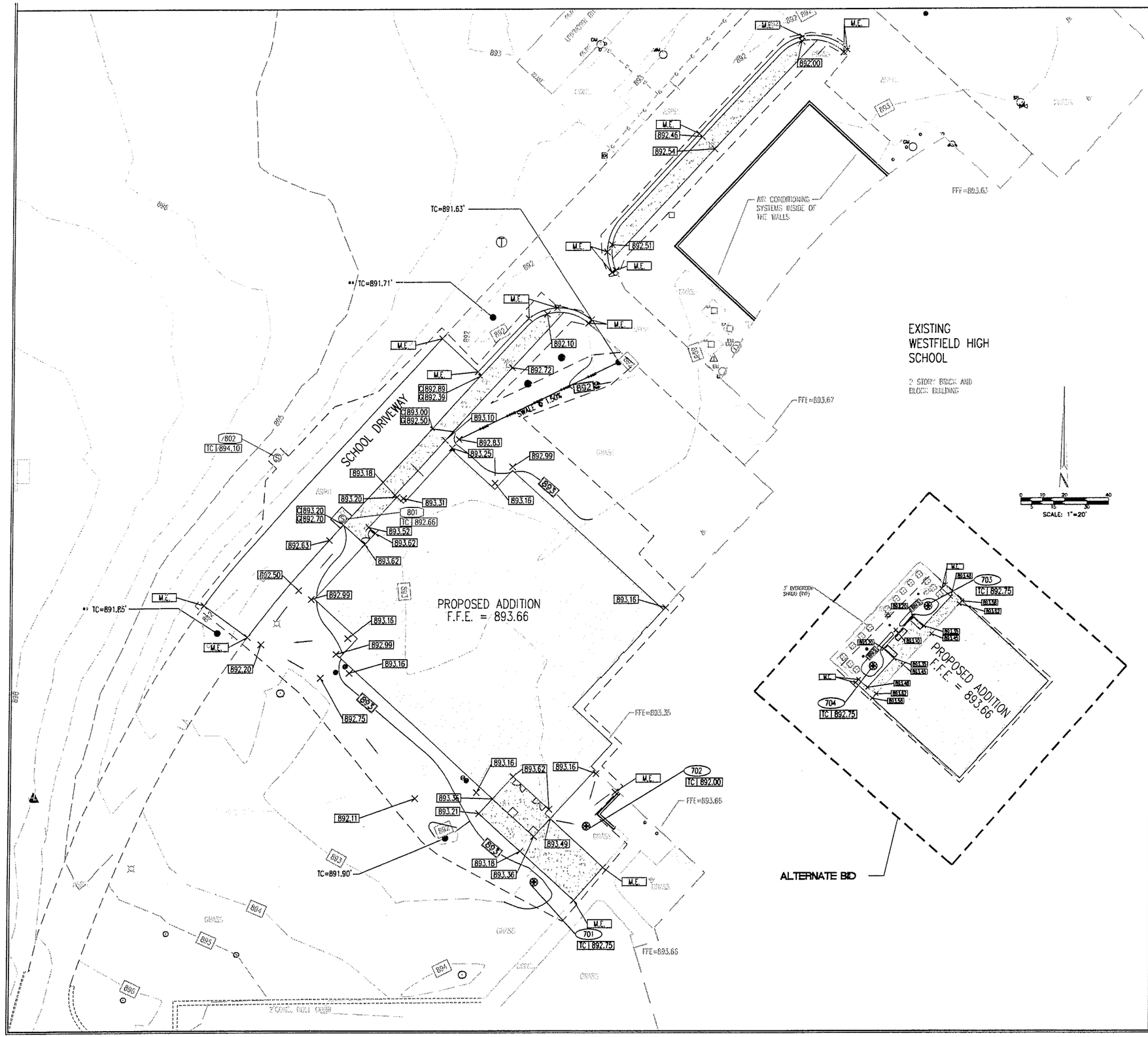

GRADING PLAN LEGEND

PROPOSED CONSTRUCTION

PROPOSED PAVEMENT SPOT GRADE	890.00
PROPOSED GROUND SPOT GRADE	893.00
MATCH EXISTING GRADE	M.E.
PROPOSED GUTTER GRADE	892.50
PROPOSED TOP OF CURB GRADE / PROPOSED GUTTER GRADE	890.00 / 889.50
PROPOSED TOP OF CASTING	TC 889.50
PROPOSED INVERT ELEVATION	IE 880.00
PROPOSED 1 FT. CONTOUR	895
PROPOSED INDEX CONTOUR	895
PROPOSED SWALE	SWALE @ 1.00%
PROPOSED DRAINAGE FLOW ARROW (DIRECTION)	

GRADING NOTES

1. ALL GRADES AT BOUNDARY SHALL MEET EXISTING GRADES.
2. UPON COMPLETION OF MASS EARTHWORK, TOPSOIL SHALL BE SPREAD TO A DEPTH OF FOUR TO SIX (4 TO 6) INCHES IN LAWN AREAS TO BE SODDED. EXCESS TOPSOIL SHALL BE HAULED OFF SITE AT CONTRACTOR EXPENSE AND/OR MOUNDED IN AN ON-SITE AREA TO BE DETERMINED BY WESTFIELD WASHINGTON SCHOOLS.
3. EXISTING UTILITY LOCATIONS ARE APPROXIMATE, CONTRACTOR TO FIELD VERIFY HORIZONTAL AND VERTICAL LOCATIONS PRIOR TO MAJOR EARTHWORK, WITHIN THE PROPOSED CONSTRUCTION LIMITS.
4. BUILDING PAD AREAS AND STREETS DESIGNATED FOR FILL SHALL BE CONSTRUCTED OF SUITABLE FILL MATERIAL AND COMPACTED PER SPECIFICATIONS. ALL FILL AREAS FOR BUILDING AREAS AND STREETS ARE TO BE STRIPPED OF TOPSOIL PRIOR TO PLACEMENT OF FILL.
5. CONTRACTOR SHALL PRESERVE EXISTING TREES WHEREVER POSSIBLE. OWNER AND OWNER'S REPRESENTATIVE SHALL BE CONSULTED FOR CLEARING LIMITS. CLEARING LIMITS SHALL CONSIST OF ALL TREES WITHIN STREET AREAS, UTILITY INSTALLATION LIMITS AND CUT FILL AREAS.
6. TOP OF CASTING (TC) TC SHALL INDICATE THE ELEVATION THAT WATER WOULD ENTER A STRUCTURE, WHEN A STRUCTURE IS NOT A CURB INLET. TC SHALL INDICATE TOP OF CURB WHEN STRUCTURE IS A CURB INLET.
7. ANY DISCREPANCIES OR CONFLICTS WHICH BECOME APPARENT BEFORE OR DURING CONSTRUCTION SHALL BE BROUGHT TO THE ATTENTION OF THE DESIGN ENGINEER PRIOR TO CONSTRUCTION SO THAT CLARIFICATION OR REDESIGN MAY OCCUR.
8. CONTOURS SHOWN FOR REFERENCE TO MEET JURISDICTIONAL REQUIREMENTS. CONTRACTOR SHOULD GRADE SITE PER SPOT GRADE ELEVATIONS.

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CAUTION

LOCATIONS OF ALL EXISTING UNDERGROUND UTILITIES SHOWN ON THIS PLAN ARE BASED UPON ABOVE GROUND EVIDENCE (including, but not limited to, manholes, inlets, valves, and marks made upon the ground by others) AND ARE SPECULATIVE IN NATURE. THERE MAY ALSO BE OTHER EXISTING UNDERGROUND UTILITIES FOR WHICH THERE IS NO ABOVE GROUND EVIDENCE OR FOR WHICH NO ABOVE GROUND EVIDENCE WAS OBSERVED. THE EXACT LOCATIONS OF SAID EXISTING UNDERGROUND UTILITIES SHOULD BE VERIFIED BY THE CONTRACTOR PRIOR TO ANY AND ALL CONSTRUCTION.

Revisions			
Num	Date	Description	
-	-	-	
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-	-	-	
-	-	-	

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INTERIOR DESIGN
CIVIL ENGINEERING
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GRADING PLAN
WESTFIELD HIGH SCHOOL ADDITION
WESTFIELD WASHINGTON SCHOOLS
322 WEST MAIN STREET
WESTFIELD, IN 46074

CERTIFIED BY:

DAVID A. LACK
REGISTERED
PE 10000126
STATE OF INDIANA
PROFESSIONAL ENGINEER

Date 02-06-09

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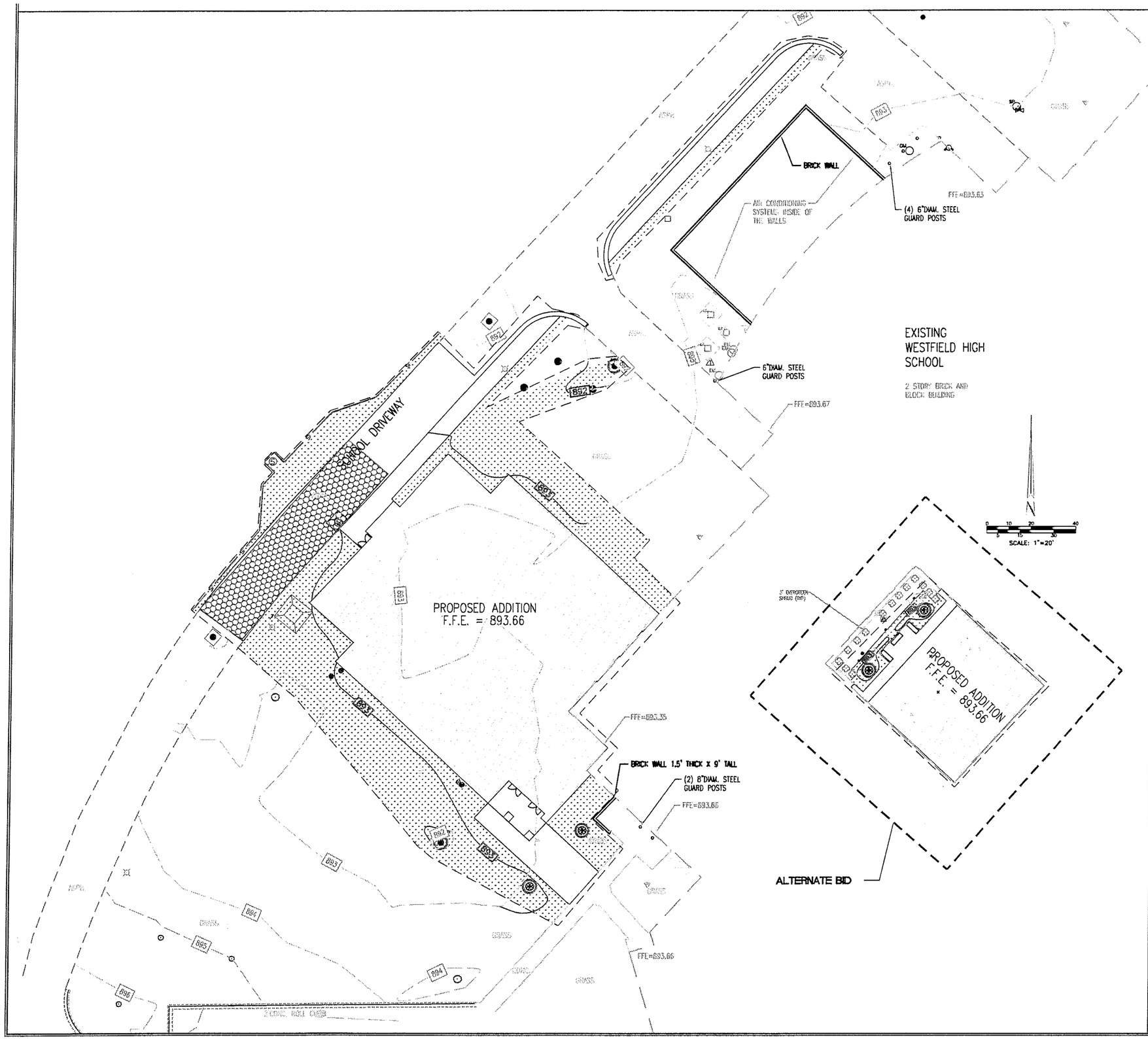

LEGEND
PROPOSED EROSION CONTROL

SYMBOL/ HATCH/LINETYPE	DETAIL NO.	DESCRIPTION
	EC-16A	CONCRETE END SECTION WITH RIP-RAP DETAIL (UPPER INVERT)
	EC-36	INSERT (BAG) INLET PROTECTION
	EC-3	GEOTEXTILE FABRIC YARD INLET PROTECTION
	EC-16	CONCTETE END SECTION WITH RIP-RAP DETAIL (LOWER INVERT)
RIP RAP d50=8" "AREA" Sq YARDS		
	EC-29	ROCK CHECK DAM BARRIERS (TYP. 200' O.C.)
		PERMANENT SEEDING WITH EROSION CONTROL BLANKET - SC150
		PERMANENT SEEDING WITH MULCH
		TEMPORARY SEEDING WITH MULCH
	EC-30	TEMPORARY CONSTRUCTION ENTRANCE 12 INCHES OF #2 STONE (24'W x 100'L) Minimum
	EC-33	CONCRETE WASHOUT W/SIGN
5F	EC-2	SILT FENCE BARRIER
TP TP	EC-15 EC-15A	FENCING FOR TREE PRESERVATION
		CONSTRUCTION LIMITS / FENCING

EROSION CONTROL NOTES:

1. SEE SHEET C402 FOR SOILS MAP AND SOIL CHARACTERISTICS.
2. SEE SHEET C402 FOR EROSION CONTROL DETAILS.
3. SILT FENCE BARRIER TO BE INSTALLED PRIOR TO CONSTRUCTION.
4. EROSION CONTROL MEASURES TO BE MAINTAINED THROUGHOUT THE ENTIRE CONSTRUCTION PROCESS.
5. STORM WATER DISCHARGE WILL NOT ENTER THE GROUNDWATER FOR THIS PROJECT.
6. SEE EROSION CONTROL SPECIFICATIONS FOR ALL EROSION CONTROL MEASURES SCHEDULES AND SEQUENCES.
7. CONTRACTOR TO PROVIDE A STABLE TEMPORARY GRAVEL CONSTRUCTION ENTRANCE/EXIT CONDITION FROM THE CONSTRUCTION SITE TO KEEP MUD AND SEDIMENT OFF PUBLIC ROADS.
8. EROSION CONTROL MAINTENANCE - SITE TO BE INSPECTED AT LEAST ONCE A WEEK AND MAKE REPAIRS IMMEDIATELY AFTER PERIODS OF RAINFALL.
9. CONTRACTOR TO PROVIDE THE COUNTY SOIL AND WATER CONSERVATION DISTRICT(S) WITH A NARRATIVE DESCRIBING THE CONSTRUCTION SEQUENCE, INCLUDING START DATES FOR EACH LAND DISTURBING ACTIVITY.
10. THE EROSION CONTROL PLAN MUST BE EXECUTED PRIOR TO CONSTRUCTION.
11. ADDITIONAL EROSION CONTROL MEASURES MAY BE REQUIRED IN THE FIELD BY THE WRWD INSPECTORS.
12. ALL EROSION CONTROL MATERIAL NEEDS TO BE APPROVED BY THE WRWD INSPECTORS PRIOR TO INSTALLATION.
13. ANY DISCREPANCIES OR CONFLICTS WHICH BECOME APPARENT BEFORE OR DURING CONSTRUCTION SHALL BE BROUGHT TO THE ATTENTION OF THE DESIGN ENGINEER PRIOR TO CONSTRUCTION SO THAT CLARIFICATION OR REDESIGN MAY OCCUR.

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Revisions		
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EROSION CONTROL PLAN
WESTFIELD HIGH SCHOOL ADDITION
WESTFIELD WASHINGTON SCHOOLS
322 WEST MAIN STREET
WESTFIELD, IN 46074

CERTIFIED BY:

DAVID A. LACH
REGISTERED
FE 10000126
STATE OF INDIANA
PROFESSIONAL ENGINEER

Date 02-06-09

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DESIGN

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Sheet C401
Date 02-06-09
Project Number 040338-20201

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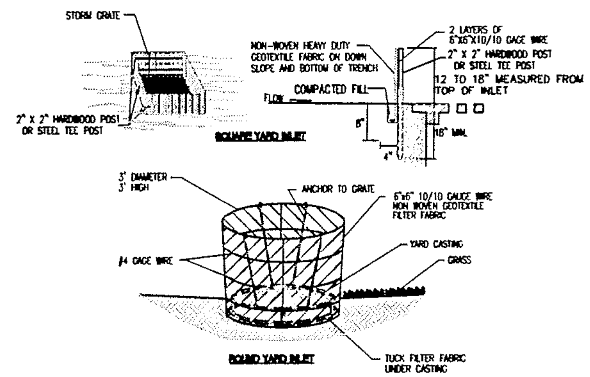
Drawing: 03-2004\040338\20201\CAD\DWG\C401.DWG
Layout: Sec. C401
File Last Updated: Thu, 5 Feb 2009
Plotted By: JACKSONCR
Date: 02/06/2009 9:00:00 AM



Installation

1. Dig an eight-inch deep, four-inch wide trench around the perimeter of the inlet.
2. If using pre-assembled geotextile fabric and posts, drive the posts into the soil, tightly stretching the geotextile fabric between posts as each is driven. (Posts must be placed on the inlet side of the anchor trench with the geotextile fabric on the side of the trench farthest from the inlet.)

Note: If assembling the geotextile fabric and posts on-site, drive the posts into the soil and then secure the geotextile fabric to the posts by placing a piece of lathe over the fabric and fastening it to the post (stretching the fabric between posts as it is fastened).

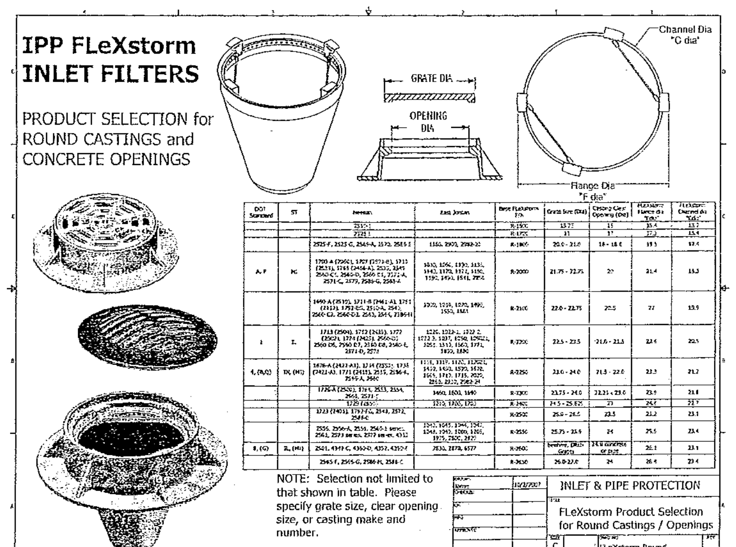
3. Use the wrap join method when joining posts
4. Place the bottom 12 inches of geotextile fabric into the eight-inch deep trench, laying the remaining four inches in the bottom of the trench and extending away from the inlet.
5. Backfill the trench with soil material and compact it in place.
6. Brace the posts by nailing braces into each corner post or utilize rigid panels to support fabric.

Maintenance

- Inspect daily.
- Inspect geotextile fabric and make needed repairs immediately.
- Remove sediment from pool area to provide storage for the next storm event. Avoid damaging or undercutting fabric during sediment removal.
- When contributing drainage area has been stabilized, remove sediment, properly dispose of all construction material, grade area to the elevation of the storm drain inlet top, then stabilize immediately.

EC-3 GEOTEXTILE FABRIC YARD INLET PROTECTION

NO SCALE



INSTALLATION AND MAINTENANCE GUIDELINES

INSTILLATION:

- REMOVE THE GRATE FROM THE MANHOLE.
- USING HANDLES, DROP INLET PROTECTION INTO MANHOLE. BE SURE CLIPS HOOK ONTO CASTING SO IT DOESN'T FALL INTO MANHOLE.
- RESTORE GRATE TO MANHOLE.

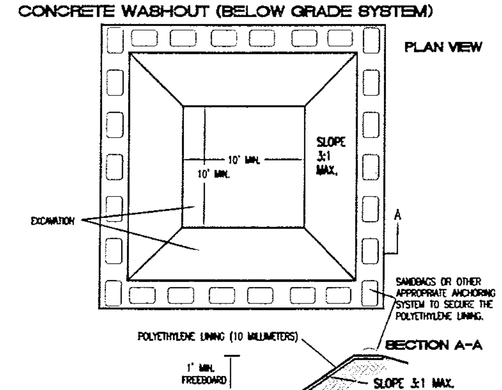
MAINTENANCE:

1. INSPECT DAILY
2. REMOVE ALL ACCUMULATED SEDIMENT AFTER EACH STORM EVENT. DISPOSE OF SEDIMENT IN AN AREA WHERE IT WILL NOT REENTER THE PAVED AREA OR STORM DRAINS. TO EMPTY UNIT, LIFT THE UNIT OUT OF THE INLET BY USING THE HANDLES.
3. WHEN CONTRIBUTING DRAINAGE ARE HAS BEEN STABILIZED REMOVE INLET PROTECTION

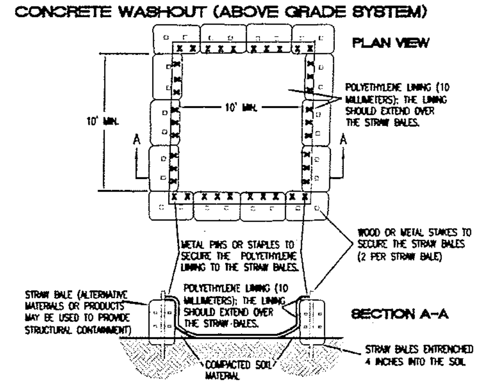
EC-36 INSERT (BAG) INLET PROTECTION

NO SCALE

CONCRETE WASHOUT (BELOW GRADE SYSTEM)



CONCRETE WASHOUT (ABOVE GRADE SYSTEM)



Installation

Prefabricated Washout Systems/Containers

- Install and locate according to the manufacturer's recommendations.

Designed and Installed Systems

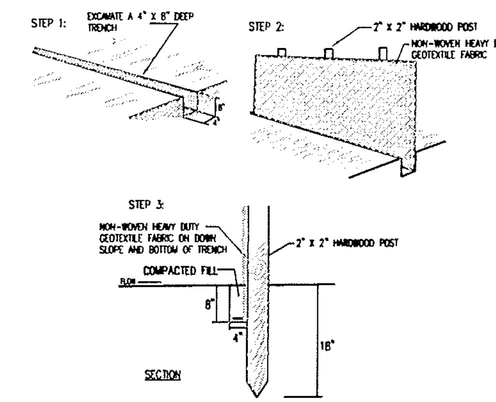
- Utilize and follow the design in the storm water pollution prevention plan to install the system.
- Dependent upon the type of system, either excavate the pit or install the containment system.
- A base shall be constructed and prepared that is free of rocks and other debris that may cause tears or punctures in the polyethylene lining.
- Install the polyethylene lining. For excavated systems, the lining should extend over the entire excavation. The lining for bermed systems should be installed over the pooling area with enough material to extend the lining over the berm or containment system. The lining should be secured with pins, staples, or other fasteners.
- Place flags, safety fencing, or equivalent to provide a barrier to construction equipment and other traffic.
- Place a non-collapsing, non-water holding cover over the washout facility prior to a predicted rainfall event to prevent accumulation of water and possible overflow of the system (optional).
- Install signage that identifies concrete washout areas.
- Post signs directing contractors and suppliers to designated locations.
- Where necessary, provide stable ingress and egress or alternative approach pad for concrete washout systems.

Maintenance

- Inspect daily and after each storm event.
- Inspect the integrity of the overall structure including, where applicable, the containment system.
- Inspect the system for leaks, spills, and tracking of soil by equipment.
- Inspect the polyethylene lining for failure, including tears and punctures.
- Once concrete wastes harden, remove and dispose of the material.
- Excess concrete should be removed when the washout system reaches 50 percent of the design capacity. Use of the system should be discontinued until appropriate measures can be initiated to clean the structure. Prefabricated systems should also utilize this criterion, unless the manufacturer has alternate specifications.
- Upon removal of the solids, inspect the structure. Repair the structure as needed or construct a new system.
- Dispose of all concrete in a legal manner. Reuse the material on site, recycle, or haul the material to an approved construction/demolition landfill site. Recycling of material is encouraged. The waste material can be used for multiple applications including but not limited to roadbeds and building. The availability for recycling should be checked locally.
- The plastic liner should be replaced after every cleaning; the removal of material will usually damage the lining.
- The concrete washout system should be repaired or enlarged as necessary to maintain capacity for concrete waste.
- Concrete washout systems are designed to promote evaporation. However, if the liquids do not evaporate and the system is near capacity it may be necessary to vacuum or remove the liquids and dispose of them in an acceptable method. Disposal may be allowed at the local sanitary sewer authority provided their National Pollutant Discharge Elimination System permits allow for acceptance of this material. Another option would be to utilize a secondary containment system or basin for further dewatering.
- Prefabricated units are often pumped and the company supplying the unit provides this service.
- Inspect construction activities on a regular basis to ensure suppliers, contractors, and others are utilizing designated washout areas. If concrete waste is being disposed of improperly, identify the violators and take appropriate action.
- When concrete washout systems are no longer required, the concrete washout systems shall be closed. Dispose of all hardened concrete and other materials used to construct the system.
- Holes, depressions and other land disturbances associated with the system should be backfilled, graded, and stabilized.

EC-33 CONCRETE WASHOUT DETAIL

NO SCALE



Installation

1. Lay out the location of the fence so that it is parallel to the contour of the slope and at least 10 feet beyond the toe of the slope to provide a sediment storage area. Turn the ends of the fence up slope such that the point of contact between the ground and the bottom of the fence end terminates at a higher elevation than the top of the fence at its lowest point.
2. Excavate an eight-inch deep by four-inch wide trench along the entire length of the fence line. Installation by plowing is also acceptable.
3. Install the silt fence with the filter fabric located on the up-slope side of the excavated trench and the support posts on the down-slope side of the trench.
4. Drive the support posts at least 18 inches into the ground, tightly stretching the fabric between the posts as each is driven into the soil. A minimum of 12 inches of the filter fabric should extend into the trench.
5. Lay the lower four inches of filter fabric on the bottom of the trench and extend it toward the up-slope side of the trench.
6. Backfill the trench with soil material and compact it in place.

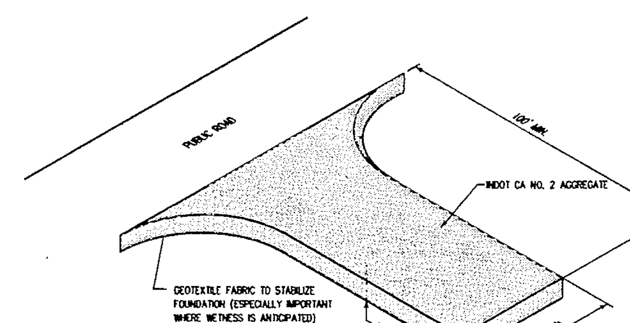
Note: If the silt fence is being constructed on-site, attach the filter fabric to the support posts and attach wooden lathe to secure the fabric to the posts. Allow for at least 12 inches of fabric below ground level. Complete the silt fence installation, following steps 1 through 6 above.

Maintenance

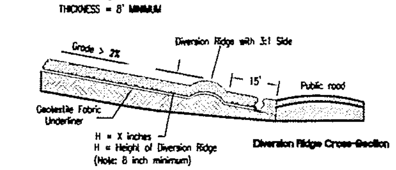
- Inspect within 24 hours of a rain event and at least once every seven calendar days.
- If fence fabric tears, starts to decompose, or in any way becomes ineffective, replace the affected portion immediately. **Note: All repairs should meet specifications as outlined within this measure.**
- Remove deposited sediment when it is causing the filter fabric to bulge or when it reaches one-half the height of the fence at its lowest point. When contributing drainage area has been stabilized, remove the fence and sediment deposits, grade the site to blend with the surrounding area, and stabilize.

EC-2 SILT FENCE BARRIER INSTALLATION

NO SCALE



NOTE: FOR SITES LARGER THAN 2 ACRES:
LENGTH = 150' MINIMUM
WIDTH = 20' MINIMUM
THICKNESS = 8" MINIMUM



INSTALLATION NOTES:

1. Remove all vegetation and other objectionable material from the foundation area.
2. Grade foundation and crown for positive drainage. If the slope of the construction entrance is toward a public road and exceeds two percent, construct an eight inch high diversion ridge with a ratio of 3-to-1 side slopes across the foundation area about 15 feet from the entrance to divert runoff away from the road.
3. Install a culvert pipe under the pad if needed to maintain proper public road drainage.
4. If wet conditions are anticipated, place geotextile fabric on the graded foundation to improve stability.
5. Place aggregate (INDOT CA No. 2) to the dimensions and grade shown in the construction plans, leaving the surface smooth and sloped for drainage.
6. Top-dress the first 50 feet adjacent to the public roadway with two to three inches of washed aggregate (INDOT CA NO. 53) [optional, used primarily where the purposed of the pad is keep soil from adhering to vehicle tires]
7. Where possible, divert all storm water runoff and drainage from the ingress/egress pad to a sediment trap or basin.

MAINTENANCE NOTES:

- Inspect daily.
- Reshape pad as needed for drainage and runoff control.
- Top dress with clean aggregate as needed.
- Immediately remove mud and sediment tracked or washed onto public roads.
- Flushing should only be used if the water can be conveyed into a sediment trap or basin.

EC-30 TEMPORARY CONSTRUCTION INGRESS / EGRESS PAD

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Revisions: Mark | Date | Description

EROSION CONTROL DETAILS
WESTFIELD HIGH SCHOOL ADDITION
WESTFIELD WASHINGTON SCHOOLS
322 WEST MAIN STREET
WESTFIELD, IN 46074

CERTIFIED BY:
DAVID A. LACH REGISTERED PE 10000126 STATE OF INDIANA PROFESSIONAL ENGINEER
Date 02-06-09
COVERING
DESIGN
1-800-382-5544 CALL TOLL FREE
Drawn By: —
Checked By: —
Quality Assurance: —
Scale: 1" = 20'
Sheet C402
Date 02-06-09
Project Number 040338-20201

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CONSTRUCTION/STORMWATER POLLUTION PREVENTION PLAN

ASSESSMENT OF CONSTRUCTION PLAN ELEMENTS (SECTION A)

A1 Plan Index Showing Locations Of Required Items
See Cover Sheet

A2 Site Plat Showing Site, Buildings, Parking Lots, Streets
N/A

A3 Narrative Describing Project Nature And Purpose
BUILDING ADDITIONS TO THE EXISTING HIGH SCHOOL

A4 Vicinity Map Showing Project Location
See Sheet CS

A5 Legal Description Of The Project Site
Longitude 86° 08' 00" W Latitude 40° 02' 45" N

A6 Location Of All Lots And Proposed Site Improvements
See Sheet C201

A7 Hydrologic Unit Code (14 Digit)
05120201090030 - Cool Creek

A8 Notation Of Any State Or Federal Water Quality Permits
None.

A9 Specific Points Where Stormwater Discharge Will Leave The Site
THROUGH THE EXISTING STORM SEWER SYSTEM.

See sheets C501 for the extents of The Stormwater Management Plan components.

A10 Location And Name Of All Wetlands, Lakes And Water Courses On And Adjacent To The Site
N/A

A11 Identification Of All Receiving Waters
N/A

A12 Identification Of Potential Discharges To Groundwater
None

A13 100 Year Floodplains, Floodways, And Floodway Fringes
None

A14 Pre-construction And Post Construction Estimate Of Peak Discharge
The release rates from the site will remain the same. The existing pond has been sized to accommodate this improvement.

A15 Adjacent Land Use, Including Upstream Watershed
South - Residential, West - US 31, North - School, East - Residential

A16 Locations And Approximate Boundaries Of All Disturbed Areas
See sheets C401

A17 Identification Of Existing Vegetative Cover
See sheets C101

A18 Soils Map Including Descriptions And Limitations
See this sheet for soils descriptions and limitations

A19 Location, Size And Dimensions Of Proposed Stormwater Systems
See sheet C501

A20 Plan For Any Off-site Construction Activities Associated With This Project
None.

A21 Locations Of Proposed Soil Stockpiles, Borrow And/ Or Disposal Areas
None. Topsoil will be hauled off.

A22 Existing Site Topography At An Interval Appropriate To Show Detailed Drainage Patterns
See sheets C101

A23 Proposed Final Topography At An Interval Appropriate To Show Detailed Drainage Patterns
See sheets C301

ASSESSMENT OF STORMWATER POLLUTION PREVENTION PLAN-CONSTRUCTION COMPONENT (SECTION B)

B1 Description Of Potential Pollutant Sources Associated With Construction Activities
The primary pollutant associated with construction activities is sediment, additional pollutants may be generated by construction vehicle operation and maintenance (e.g. fueling, changing hydraulic fluids and oils); concrete washout; improper storage of construction materials; improper disposal of construction trash and debris; improper application or over application of fertilizers and pesticides; and improper storage, application, and disposal of soluble materials or other materials that may be mobilized by storm water runoff. equipment and fuel will be stored in a central location and the contractor shall institute methods and procedures to prevent discharge of pollutants.

B2 Sequence Describing Stormwater Quality Measure Implementation Relative To Land Disturbing Activities
See erosion and sediment control sequences and implementation on sheets C401-C403

B3 Stable Construction Entrance Locations And Specifications
See sheets C401 for location. See sheet C402 for details.

B4 Sediment Control Measures For Sheet Flow Areas
Preliminary grading and stabilization must be completed to ensure adequate drainage to the temporary or permanent runoff conveyance facilities. Silt fencing must also be implemented prior to any construction activity to ensure silt collection, stabilize disturbed areas directly after earth disturbing activities, temporary seed areas scheduled to be idle for up to one year, permanently seed all areas that are at final grade, phase projects where each subsequent phase will not begin for 8 months or more, and areas to be idle for more than one year. Erosion control measures to be installed in Sheet Flow Area. see sheet C402 for details as well as installation and maintenance procedures. See sheet C403 for seeding guidelines.

B5 Sediment Control Measures For Concentrated Flow Areas
Adequate erosion control measures must be installed within these areas prior to opening for runoff acceptance. If it is a swale or pond side slope, erosion control blanket should be installed prior to opening, the emergency spillways will contain riprap to control intensely channeled flows from runoff in an emergency. Stabilize disturbed areas directly after earth disturbing activities, temporary seed areas scheduled to be idle for up to one year, permanently seed all areas that are at final grade, phase projects where each subsequent phase will not begin for 8 months or more, and areas to be idle for more than one year. See sheets C401 for erosion control measures to be installed in concentrated flow areas. See sheet C402 for details as well as installation and maintenance procedures.

B6 Sediment Control Measures For Storm Sewer Inlet Protection
See Sheets C401 for location & type, and C402 for details.

B7 Runoff Control Measures
See sheet C401

B8 Stormwater Outlet Protection Specifications
N/A

B9 Grade Stabilization Structure Locations And Specifications
See sheet C401

B10 Erosion And Sediment Control Provisions For Stream / Channel Crossings
N/A

B11 Sediment Control Associated With Dewatering And Directional Boring Operations
N/A

B12 Location, Dimensions, Specifications And Construction Details For Each Stormwater Quality Measure
See sheet C401 and associated erosion control details on sheet C402

B13 Temporary Surface Stabilization Methods Appropriate For Each Season
See "GENERAL SEEDING & SURFACE STABILIZING PROCEDURES" on this sheet.

B14 Permanent Surface Stabilization Specifications
See "GENERAL SEEDING & SURFACE STABILIZING PROCEDURES" on this sheet.

B15 Material Handling And Spill Prevention
Expected construction materials on site may include vehicle lubricants, oils, vehicular fuels, concrete wash-out, acids, curing compounds, paints, mulch, pesticides, herbicides, fertilizer, and trash. Any toxic waste materials are to be disposed of according to local and state laws.

Small spills and leaks of these materials onto non-paved areas will be shoveled into containers or dumpsters for proper disposal.

Fueling trucks will be equipped with spill prevention kits for smaller fuel spills. all vehicular maintenance shall be performed in the same designated area throughout the construction time frame. If possible, vehicular maintenance shall be done off-site at facilities that are designed to handle any material spillage. This shall include fueling of vehicles whenever possible. The Westfield Fire Department (317)896-2704 or 911, Indiana Department of Environmental Management, Office of Emergency Response (800)-233-7745, shall be notified immediately for larger spills or leaks. The National Response Center (800)-424-8802 shall be notified and provided with the following information: Time of Spill, Location of Spill, Material, Source of Spill, Approximate Volume and Length of Spillage, Weather Conditions at Time of Spill, Personnel Present at Time of Spill, and All Action Taken for Post Spill Cleanup.

Contractor shall contact a waste recovery agency immediately for removal of contaminates and coordination of monitoring the site during cleanup until all of the hazardous material has been removed. Contractor shall cooperate with idem during and after the spill to insure all required cleanup and filing reports are properly submitted.

The Developer shall be continually informed of any contamination concerns occurring on the site. The construction manager shall keep on site a list of qualified contractors for spill remediation. All site personnel, including maintenance employees, shall be made aware of proper spill prevention and remediation techniques. All materials used to absorb spills shall be properly disposed of in an approved manor with local and state laws. do not flush spill materials with water unless directed to do so by a governing agency. It is important that all manufacturer's instructions be followed when using or applying all fertilizers, herbicides, and pesticides.

B16 Monitoring And Maintenance Guidelines For Each Proposed Storm Water Quality Measure
See sheet C402 for details containing maintenance requirements for each storm water quality measure.

B17 Erosion And Sediment Control Specifications For Individual Building Lots
N/A

ASSESSMENT OF STORMWATER POLLUTION PREVENTION POST-CONSTRUCTION COMPONENT (SECTION C)

C1 Description Of Pollutants And Their Sources Associated With The Proposed Land Use
Potential pollutant sources post construction include fertilizers, herbicides, pesticides and other lawn treatment applications along with assorted fuels, oils and liquids associated with vehicular traffic throughout the developed site. there are downstream water quality effects due to channeling discharges to a single point. This can result in bank erosion, down cutting of the channel bottom.

C2 Sequence Describing Stormwater Quality Measure Implementation
The existing pond acts a post construction water quality bmp.

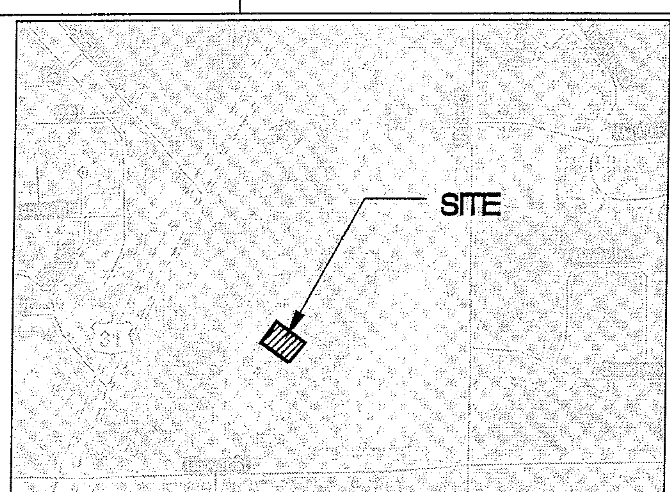
C3 Description Of Proposed Post Construction Stormwater Quality Measures
N/A

C4 Location, Dimensions, Specifications And Construction Details Of Each Stormwater Quality Measure
N/A

C5 Description Of Maintenance Guidelines For Post Construction Stormwater Quality Measures
N/A

EROSION AND SEDIMENT CONTROL SEQUENCE AND IMPLEMENTATION

1. Install temporary construction entrance off existing drive. (See C401)
2. Install silt fencing along property lines and along construction limits as shown on C401 (See detail on sheet C402). Dust shall be kept to a minimum by utilizing sprinkling, calcium chloride, vegetative cover, spray on adhesive or other approved methods.
3. Identify construction staging, concrete washout areas, material storage and topsoil stockpile areas. Each area shall be properly protected and delineated prior to construction.
4. The NOI and contact information for the person with onsite responsibilities must be posted.
5. Contact Indiana Underground Planned Protection Systems, Inc. ("Holey Moley") for underground Utility locations. (1-800-382-5544)
6. Before opening up the site, first evaluate, mark and protect important trees and associated root zones, unique areas to be preserved (i.e. wetlands), or existing vegetation suitable for use as filter strips (especially in perimeter areas).
7. First, strip and haul off any existing topsoil on-site.
8. Begin mass earthwork for building addition preliminary grading. See "General Seeding and Surface Stabilization Procedures" for temporary seeding guidelines on this sheet.
9. Repair any silt fencing if damaged. If silt fence is 1/3 height of fabric, remove silt and replace to original condition. See detail on Sheet C402.
10. Immediately after grading, apply surface stabilization practices on all graded areas, using permanent measures in accordance with the erosion control plan. However, if weather delays permanent stabilization, temporary seeding and/or mulching may be necessary as a provisional measure. Also stabilize (using temporary seeding/mulching or other suitable means) any disturbed area where active construction will not take place for 15 working days.
11. After construction and final grading, landscape and permanently stabilize all disturbed areas, including borrow and disposal areas. Also remove temporary runoff control structures and any unstable sediment around them, and stabilize these areas with permanent seeding and erosion control blanket if necessary.
12. Maintain all erosion and sediment control practices until all disturbed areas are permanently stabilized.



SOILS MAP
SCALE N/A

Hamilton County

Br - Brookston silt loam with surface decreasing.
Major factor affecting urban uses include surface water ponding, seasonal high water table, and severe internal wetness.

CrA - Crosby silt loam on 0 to 3 percent slopes.
Major factors affecting urban uses include slight surface ponding, seasonal high water table, and moderate internal wetness.

GENERAL SEEDING and SURFACE STABILIZATION PROCEDURES

(1) TEMPORARY SEEDING

Table 1. Temporary Seeding Specifications

Seed Species 1	Rate per Acre	Planting Depth	Optimum Dates 2
Wheat or Rye	150 lbs.	1 to 1-1/2 inches	Sept. 15 - Oct. 30
Spring Oats	100 lbs.	1 inch	March 1 - April 15
Annual Ryegrass	40 lbs.	1-1/4 inch	March 1 - May 1 Aug. 1 - Sept. 1
German Millet	40 lbs.	1 to 2 inches	May 1 - June 1
Sudangrass	35 lbs.	1 to 2 inches	May 1 - July 30
Buckwheat	60 lbs.	1 to 2 inches	April 15 - June 1
Corn (broadcast)	300 lbs.	1 to 2 inches	May 11 - Aug. 10
Sorghum	35 lbs.	1 to 2 inches	May 1 - July 15

1 Perennial species may be used as a temporary cover, especially if the area to be seeded will remain idle for more than one year (See Permanent Seeding).
2 Seeding done outside the optimum seeding dates increases the chances of seeding failure. Dates may be extended or shortened based on the location of the project site within the state.

Notes:
Mulch alone is an acceptable temporary cover and may be used in lieu of temporary seeding, provided that it is appropriately anchored.
A high potential for fertilizer, seed, and mulch to wash exists on steep banks, cuts, and in channels and areas of concentrated flow.

Application

Seedbed Preparation
1. Test soil to determine pH and nutrient levels.
2. Apply soil amendments as recommended by the soil test. If testing is not done, apply 400 to 600 pounds per acre of 12-12-12 analysis fertilizer, or equivalent.
3. Work the soil amendments into the upper two to four inches of the soil with a disk or rake operated across the slope.

Seeding
1. Select a seed species or an appropriate seed mixture and application rate from Table 1.
2. Apply seed uniformly with a drill or cultipacker seeder or by broadcasting. Plant or cover seed to the depth shown in Table 1.

Notes:
1. If drilling or broadcasting the seed, ensure good seed-to-soil contact by firming the seedbed with a roller or cultipacker after completing seeding operations. Daily seeding when the soil is moist is usually most effective.
2. If seeding is done with a hydroseeder, fertilizer and mulch can be applied with the seed in a slurry mixture.
3. Apply mulch (See Mulching and Compost Mulching Requirements Below) and anchor it in place.
4.

Maintenance
Inspect within 24 hours of each rain event and at least once every seven calendar days.
Check for erosion or movement of mulch and repair immediately.
Monitor for erosion damage and adequate cover (80 percent density); reseed, fertilize, and apply mulch where necessary.
If nitrogen deficiency is apparent, top-dress fall seeded wheat or rye seeding with 50 pounds per acre of nitrogen in February or March.

(2) PERMANENT SEEDING

Application

Site Preparation
1. Grade the site to achieve positive drainage.
2. Add topsoil or compost mulch to achieve needed depth for establishment of vegetation. (Compost material may be added to improve soil moisture holding capacity, soil friability, and nutrient availability.)

Seedbed Preparation
1. Test soil to determine pH and nutrient levels.
2. Apply soil amendments as recommended by the soil test and work into the upper two to four inches of soil. If testing is not done, apply 400 to 600 pounds per acre of 12-12-12 analysis fertilizer, or equivalent.
3. Till the soil to obtain a uniform seedbed. Use a disk or rake, operated across the slope, to work the soil amendments into the upper two to four inches of the soil.

Seeding
Optimum seeding dates are March 1 to May 10 and August 10 to September 30. Permanent seeding done between May 10 and August 10 may need to be irrigated. Seeding outside or beyond optimum seeding dates is still possible with the understanding that reseeding or overseeding may be required if adequate surface cover is not achieved. Reseeding or overseeding can be easily accomplished if the soil surface remains well protected with mulch.
1. Select a seeding mixture and rate from Table 1 Permanent Seeding Recommendations. Select seed mixture based on site conditions, soil pH, intended land use, and expected level of maintenance.
2. Apply seed uniformly with a drill or cultipacker seeder or by broadcasting. Plant or cover the seed to a depth of one-fourth to one-half inch. If drilling or broadcasting the seed, ensure good seed-to-soil contact by firming the seedbed with a roller or cultipacker after completing seeding operations. (If seeding is done with a hydroseeder fertilizer and mulch can be applied with the seed in a slurry mixture.)
3. Mulch all seeded areas and use appropriate methods to anchor the mulch in place. Consider using erosion control blankets on sloping areas and conveyance channels.

Maintenance
- Inspect within 24 hours of each rain event and at least once every seven calendar days until the vegetation is successfully established.
- Characteristics of a successful stand include vigorous dark green or bluishgreen seedlings with a uniform vegetative cover density of 90 percent or more.
- Check for erosion or movement of mulch.
- Repair damaged, bare, gullied, or sparsely vegetated areas and then fertilize, reseed, and apply and anchor mulch.
- If plant cover is sparse or patchy, evaluate the plant materials chosen, soil fertility, moisture condition, and mulch application; repair affected areas either by overseeding or preparing a new seedbed and reseeding. Apply and anchor mulch on the newly seeded areas.
- If vegetation fails to grow, consider soil testing to determine soil pH or nutrient deficiency problems. (Contact your soil and water conservation district or cooperative extension office for assistance.)
- If additional fertilization is needed to get a satisfactory stand, do so according to soil test recommendations.
- Add fertilizer the following growing season. Fertilize according to soil test recommendations.
- Fertilize turf areas annually. Apply fertilizer in a split application. For cool-season grasses, apply one-half of the fertilizer in late spring and one-half in early fall. For warm-season grasses, apply one-third in early spring, one-third in late spring, and the remaining one-third in middle summer.

Table 1 Permanent Seeding Recommendations
This table provides several seed mixture options. Additional seed mixtures are available commercially. When selecting a mixture, consider intended land use and site conditions, including soil properties (e.g., soil pH and drainage), slope aspect, and the tolerance of each species to shade and drought.

Open Low-Maintenance Areas (Remaining idle more than six months)

Seed Mixtures	Rate per Acre Pure Live Seed	Optimum Soil pH
1. Perennial ryegrass - white clover 1	70 lbs. 2 lbs.	5.6 to 7.0
2. Perennial ryegrass - tall fescue 2	70 lbs. 50 lbs.	5.6 to 7.0
3. Tall fescue 2 - white clover 1	70 lbs. 2 lbs.	5.5 to 7.5

Steep Banks and Cuts, Low-Maintenance Areas (not mowed)

Seed Mixtures	Rate per Acre Pure Live Seed	Optimum Soil pH
1. Smooth brome grass - red clover 1	35 lbs. 20 lbs.	5.5 to 7.0
2. Tall fescue 2 - white clover 1	50 lbs. 2 lbs.	5.5 to 7.5
3. Tall fescue 2 - red clover 1	50 lbs. 20 lbs.	5.5 to 7.5
4. Orchard grass - red clover 1 - white clover 1	30 lbs. 20 lbs. 2 lbs.	5.6 to 7.0
5. Crownvetch 1 - tall fescue 2	12 lbs. 30 lbs.	5.6 to 7.0

Lawns and High-Maintenance Areas

Seed Mixtures	Rate per Acre Pure Live Seed	Optimum Soil pH
1. Bluegrass	140 lbs.	5.5 to 7.0
2. Perennial ryegrass (turf type)	60 lbs. 90 lbs.	5.6 to 7.0
3. Tall fescue (turf type)2 -bluegrass	170 lbs. 30 lbs.	5.6 to 7.5

Channels and Areas of Concentrated Flow

Seed Mixtures	Rate per Acre Pure Live Seed	Optimum Soil pH
1. Perennial ryegrass - white 1	150 lbs. 2 lbs.	5.5 to 7.0
2. Kentucky bluegrass - smooth bromegrass - switchgrass - timothy - perennial ryegrass - white clover	20 lbs. 10 lbs. 3 lbs. 4 lbs. 10 lbs. 2 lbs.	5.5 to 7.5
3. Tall fescue 1 - white clover	150 lbs. 2 lbs.	5.5 to 7.5
4. Tall fescue 2 - perennial ryegrass - Kentucky bluegrass1	150 lbs. 20 lbs. 20 lbs.	5.5 to 7.5

1 For best results: (a) legume seed should be inoculated; (b) seeding mixtures containing legumes should preferably be spring-seeded, although the grass may be fall-seeded and the legume frost-seeded (see Dormant Seeding and Frost Seeding on page 41); and (c) if legumes are fall-seeded, do so in early fall.

2 Tall fescue provides little cover for, and may be toxic to some species of wildlife. The Indiana Department of Natural Resources recognizes the need for additional research on alternatives such as buffalograss, orchardgrass, smooth bromegrass, and switchgrass. This research, in conjunction with demonstration areas, should focus on erosion control characteristics, wildlife toxicity, turf durability, and drought resistance.

Notes
1. An oat or wheat companion or nurse crop may be used with any of the above permanent seeding mixtures, at the following rates:

(a) spring oats - one-fourth to three-fourths bushel per acre
(b) wheat - no more than one-half bushel per acre

2. A high potential for fertilizer, seed, and mulch to wash exists on steep banks, cuts, and in channels and areas of concentrated flow.

(4) SOD

Installation
Sod should not be installed during hot weather, on dry soil, frozen soil, compacted clay, loose sand or gravelly substrate soils, aggregate, or pesticide-treated soil. The ideal time to lay sod is May 1 to June 1 or September 1 to September 30, although it can be installed as early as March 15 if available or June 1 to September 1 if irrigated.

Site Preparation
1. Apply topsoil if existing soil conditions are unsuitable for establishing vegetation.
2. Grade the site to achieve positive drainage and create a smooth, firm soil surface.
3. Where applicable, use a chisel plow, disk, harrow, or rake to break up compacted soils and create a favorable rooting depth of six to eight inches.

Sod Bed Preparation
1. Test soil to determine pH and nutrient levels.
2. If soil pH is too acidic for the grass sod to be installed, apply lime according to soil test results or at the rate recommended by the sod supplier.
3. Apply fertilizer as recommended by the soil test. If testing was not done, apply 400 to 600 pounds per acre of 12-12-12 analysis fertilizer, or equivalent.
4. Work the soil amendments into the upper two to four inches of soil with a disk or rake operated across the slope.
5. Rake or harrow the area to achieve a smooth final grade and then roll or cultipack the soil surface to create a firm surface on which to lay the sod.

Laying the Sod
1. Install sod within thirty-six hours of its cutting.
2. Store the sod in a shaded location during installation.
3. Immediately before laying the sod, rake the soil surface to break any crust. (If the weather is hot, lightly irrigate the soil surface prior to laying the sod.)
4. Lay sod strips in a brick-like pattern.
5. Butt all joints tightly against each other (do not stretch or overlap them), using a knife or mason's trowel to trim and fit sod into irregularly shaped areas.
6. Roll the sod lightly after installation to ensure firm contact between the sod and soil.
7. Irrigate newly sodded areas until the underlying soil is wet to a depth of four inches, and then keep moist until the grass takes root.

Slope Application
1. Install the sod strips with the longest dimension perpendicular to the slope.
2. Where slopes exceed a ratio of 3:1, staple or stake each strip at the corners and in the middle.

Channel Application
(Sodding provides quicker protection than seeding and may reduce the risk of early washout.)

1. Excavate the channel, allowing for the full thickness of the sod.
2. Lay the sod strips with the longest dimension perpendicular to channel flow.
3. Staple or stake each strip of sod at the corners and in the middle.
4. Staple jute or biodegradable polypropylene netting over the sodded area to minimize the potential for washout during establishment.

Maintenance
- Inspect within 24 hours of each rain event and at least once every seven calendar days until sod is well rooted.
- Keep sod moist until fully rooted.
- After sod is well-rooted (two to three weeks), maintain a plant height of two to three inches.
- Time mowing to avoid ruts in turf
- Fertilize turf areas annually. Apply fertilizer in a split application. For coolseason grasses, apply one-half of the fertilizer in late spring and one-half in early fall. For warm-season grasses, apply one-third in early spring, one-third in late spring and one-third in mid-summer.

(5) MULCHING

Specifications

Materials

Table 1. Mulch Specifications

Material 1	Rate per Acre	Comments
Straw or Hay	2 tons	Should be dry, free of undesirable seeds. Spread by hand or machine. Must be crimped or anchored (See Table 2).
Wood fiber or cellulose1	1 ton	Apply with a hydraulic mulch machine and use with locking agent.

1 Mulching is not recommended in concentrated flows. Consider erosion control blankets or other stabilization methods.

Coverage
The mulch should have a uniform density of at least 75 percent over the soil surface.

Anchoring

Table 2. Mulch Anchoring Methods

Anchoring Method	How to Apply
Mulch anchoring tool or farm disk (dull, serrated, and blades set straight)	Crimp or punch the straw or hay two to four inches into the soil. Operate machinery on the contour of the slope.
Cleating with dozer tracks	Operate dozer up and down slope to prevent formation of rills by dozer cleats
Wood hydromulch fibers	Apply according to manufacturer's recommendations.
Synthetic tackifiers, binders, or soil stabilizers	Apply according to manufacturer's recommendations.
Netting (synthetic or biodegradable material)	Install netting immediately after applying mulch. Anchor netting with staples. Edges of netting strips should overlap with each up-slope strip overlapping four to six inches over the adjacent down-slope strip. Best suited to slope applications. In most instances, installation details are site specific, so manufacturer's recommendations should be followed.

1 All forms of mulch must be anchored to prevent displacement by wind and/or water.

Application
1. Apply mulch at the recommended rate shown in Table 1.
2. Spread the mulch material uniformly by hand, hayfork, mulch blower, or hydraulic mulch machine. After spreading, no more than 25 percent of the ground should be visible.
3. Anchor straw or hay mulch immediately after application. The mulch can be anchored using one of the methods listed below:
   a. Crimp with a mulch anchoring tool, a weighted farm disk with dull serrated blades set straight, or track cleats of a bulldozer,
   b. Apply hydraulic mulch with short cellulose fibers,
   c. Apply a liquid tackifier, or
   d. Cover with netting secured by staples.

Maintenance
- Inspect within 24 hours of each rain event and at least once every seven calendar days.
- Check for erosion or movement of mulch; repair damaged areas, reseed, apply new mulch and anchor the mulch in place.
- Continue inspections until vegetation is firmly established.
- If erosion is severe or recurring, use erosion control blankets or other more substantial stabilization methods to protect the area.

(6) Compost Mulching

Compost Specifications
- Feedstocks may include but are not limited to well-composted vegetable matter, leaves, yard trimmings, food scraps, composted manures, paper fiber, wood bark, Class A biosolids (as defined in Title 40 of the Code of Federal Regulations at 40 CFR Part 503), or any combination thereof.
- Compost shall be produced using an aerobic composting process meeting 40 CFR Part 503 regulations, including time and temperature data indicating effective weed seed, pathogen, and insect larvae kill.
- Compost shall be well decomposed, stable, and weed free.
- Refuse free (less than one percent by weight).
- Free of any contaminants and materials toxic to plant growth.
- Inert materials not to exceed one percent by dry weight pH of 5.5 to 8.0.
- Carbon-nitrogen ratio not to exceed 100.
- Moisture content not to exceed 45 percent by dry weight.
- Variable particle size with maximum dimensions of three inches in length, one-half inch in width and one-half inch in depth.

Table 1. Compost Particle Size

Percent Passing Sieve Size			
2-Inch Sieve	1-Inch Sieve	3/4-Inch Sieve	>1/4-Inch Sieve
100%	99%	90%	25%

Bonding Agents (optional)
Tackifiers, flocculants, or microbial additives may be used to remove sediment and/or additional pollutants from storm water runoff. (All additives combined with compost materials should be tested for physical results at a certified erosion and sediment control laboratory and biologically tested for elevated beneficial microorganisms at a United States Compost Council, Seal of Testing Assurance, approved testing laboratory.)

Soil Material (optional)
Five percent to ten percent sandy loam (as classified by the U.S. Department of Agriculture soil classification system).

Cover Density
Ninety percent or greater over the soil surface.

Anchoring Method
- Moisten compost/mulch blanket for a minimum of 60 days.
- Erosion control netting (optional).

Cover Thickness

Table 2. Compost Blanket Thickness

Slope		Thickness of Compost Blanket	Thickness of Compost Blanket with Erosion Control Netting
< 25%	< 4:1	1 to 2 inches	Not Applicable
25% to 50%	4:1 to 2:1	1 to 2 inches	2 inches
> 50%	> 2:1	2 to 3 inches	3 inches

Application
1. Remove existing vegetation, large soil clods, rocks, stumps, large roots, and debris in areas where compost mulch is to be applied and dispose of in designated areas.
2. Scarify sloping areas.
3. Aerate areas to be covered with compost/mulch blanket. (Proper aeration will require a minimum of two passes oriented in opposite directions.)
4. Broadcast a minimum of one pound of nitrogen (N), one-half pound of phosphorous (P205), and one-half pound of potash (K20) per 1,000 square feet or 300 to 400 pounds per acre of 12-12-12 analysis fertilizer, or equivalent, per acre.
5. Apply compost mulch blanket with a pneumatic blower or per manufacturer's directions.
   a. Apply within three days of completing aeration operations.
   b. Overlap top of slope shoulder by five to ten feet.
   c. Seed may be applied at time of installation. (Seed must be evenly blended into the compost if applied with a pneumatic blower or applied with a calibrated seeder attachment prior to installation of the compost blanket.)
6. Water compost mulch blanket for a period of 60 days following application. (On steeper slopes, it may be necessary to install erosion control netting over the compost blanket.)
   a. Mist blanket for first seven days and then every three days throughout the remainder of the 60-day period.
   b. Maintain a constant moisture content of 40 percent to 60 percent.

Maintenance
- Inspect within 24 hours of a rain event and at least once every seven calendar days.
- Repair eroded areas.
- Reseed, if applicable.
- Monitor vegetation and apply appropriate soil amendments (if needed) per a soil test.

Cripe
Architects + Engineers
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Indianapolis, Indiana 46240
(317) 844-6777 Fax (317) 706-6464

EROSION CONTROL NOTES
WESTFIELD HIGH SCHOOL ADDITION
WESTFIELD WASHINGTON SCHOOLS
322 WEST MAIN STREET
WESTFIELD, IN 46074

CERTIFIED BY: DAVID A. LACH, PE 10000126, STATE OF INDIANA, PROFESSIONAL ENGINEER

Date 02-06-09

Sheet C403
Date 02-06-09
Project Number 040338-20201

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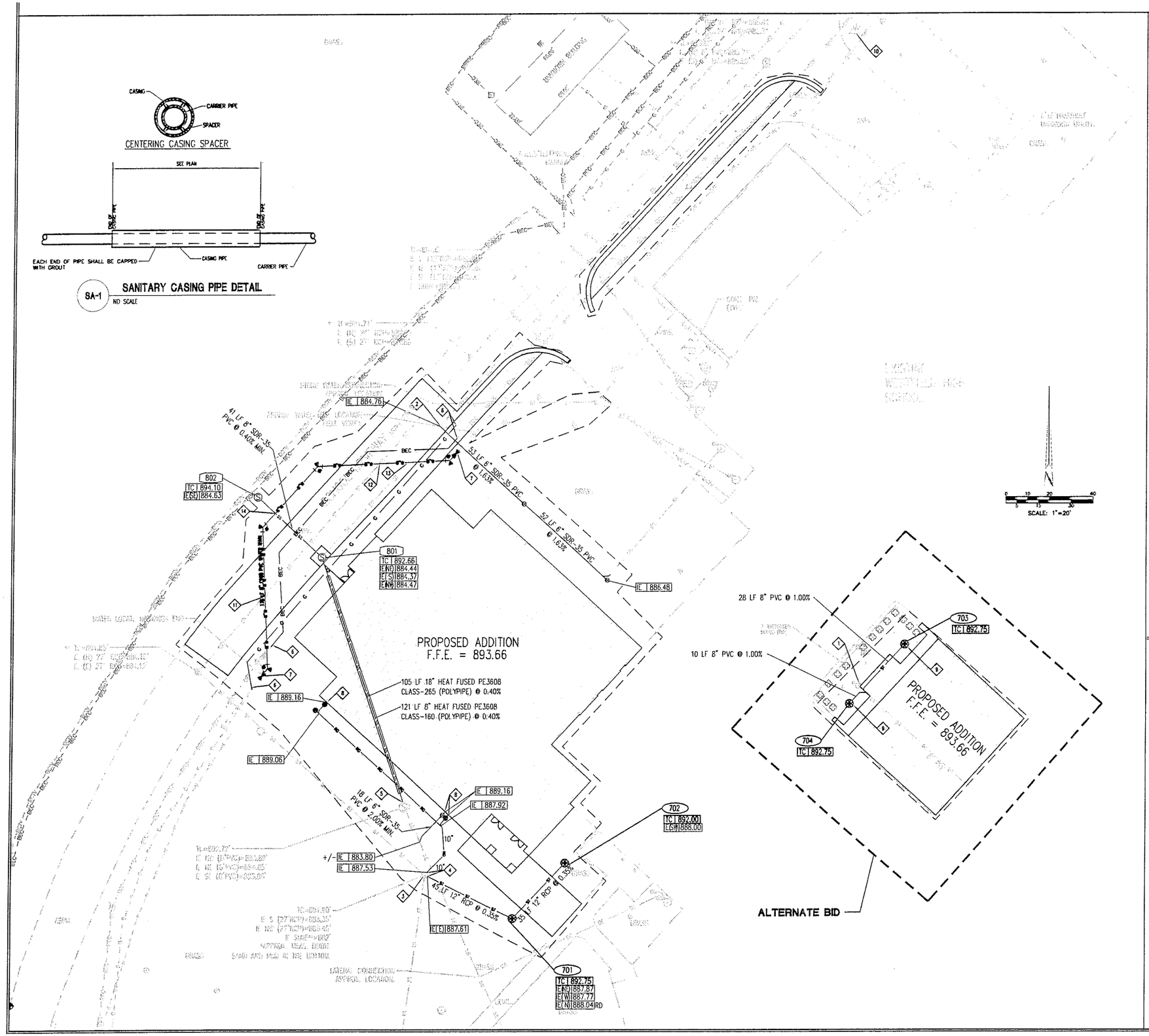
SA-1 SANITARY CASING PIPE DETAIL
NO SCALE



UTILITY PLAN LEGEND

PROPOSED CONSTRUCTION

SANITARY SEWER

SANITARY CLEANOUT
SANITARY LATERAL
SANITARY LINE
SANITARY STRUCTURE NUMBER
SANITARY CASTING ELEVATION
EASEMENT LINE

SANITARY MANHOLE

STORM SEWER

STORM SEWER INLETS
STORM MANHOLE
END SECTION
STORM SEWER STRUCTURE NUMBER
STORM SEWER INVERT ELEVATION
TOP OF CASTING ELEVATION
ROOF DRAIN

WATER

WATER LINE
WATER VALVE
PROPOSED FIRE HYDRANT
PROPOSED REDUCER
PROPOSED "TEE"
PROPOSED 45° ELBOW
PROPOSED 90° ELBOW
PROPOSED 22° ELBOW
PROPOSED 11° ELBOW
THRUST BLOCK

ELECTRIC

OVERHEAD ELECTRIC
BURIED ELECTRIC

GAS / CABLE / TELEPHONE

OVERHEAD CABLE TELEVISION
BURIED CABLE TELEVISION
GAS LINE
OVERHEAD TELEPHONE LINE
BURIED TELEPHONE LINE

UTILITY PLAN NOTES:

1. SEE ARCHITECTURAL PLUMBING PLANS FOR PLUMBING DETAILS TO AREAS FIVE (5) FEET OUTSIDE AND INSIDE OF THE PROPOSED STRUCTURE.
2. WATER LINES THROUGHOUT THE PROJECT SHALL BE INSTALLED WITH AT LEAST 54 INCHES OF COVER TO PROVIDE PROTECTION FROM FREEZING.
3. LOCATIONS OF EXISTING UNDERGROUND UTILITY LOCATIONS ARE APPROXIMATE. THE CONTRACTOR IS TO FIELD VERIFY ALL HORIZONTAL AND VERTICAL LOCATIONS PRIOR TO CONSTRUCTION.
4. ALL PROPOSED WATER LINES SHALL BE PRESSURE CLASS 350 DUCTILE IRON PIPE.
5. SEE SHEET C502 AND C503 FOR ALL UTILITY DETAILS.
6. WATER AND SEWER CROSSINGS AND SEPARATIONS SHALL BE IN ACCORDANCE WITH "TEN STATE STANDARDS" AND LOCAL CODES.
7. TOP OF CASTING (TC) TC SHALL INDICATE THE ELEVATION THAT WATER WOULD ENTER A STRUCTURE, WHEN A STRUCTURE IS NOT A CURB INLET. TC SHALL INDICATE TOP OF CURB WHEN STRUCTURE IS A CURB INLET.
8. ANY DISCREPANCIES OR CONFLICTS WHICH BECOME APPARENT BEFORE OR DURING CONSTRUCTION SHALL BE BROUGHT TO THE ATTENTION OF THE DESIGN ENGINEER PRIOR TO CONSTRUCTION SO THAT CLARIFICATION OR REDESIGN MAY OCCUR.
9. ALL ROOF DRAINS SHALL BE 8" SDR-35 PVC @ 1.00% MINIMUM SLOPE.
10. WATER MAINS 8" OR SMALLER CAN BE C900 PIPE. THE MAIN SHALL BE SADDLE TAPPED AND BEDDED WITH SAND 6-INCHES UNDER AND 12-INCHES OVER THE PIPE WITH WARNING TAPE INSTALLED 2-FEET ABOVE THE WATER MAIN. NUMBER TWELVE (#12) GAUGE LOCATING WIRE SHALL BE TAPED TO THE TOP OF THE MAIN AND PULLED THROUGH ALL VALVE BOXES (TO THE SURFACE) FOR LOCATING PURPOSES. IF DUCTILE IRON PIPE IS USED, THE MAIN MUST BE POLY WRAPPED AND WARNING TAPE INSTALLED 2-FEET ABOVE THE WATER MAIN.
11. ALL SANITARY LATERALS MUST HAVE LOCATE WIRE RUN WHEN INSTALLING.

UTILITY PLAN KEYNOTES

1. LOWER EXISTING CLEANOUT TO PROPOSED GRADE (SEE GRADING PLAN)
2. LATERAL CONNECTION TO EXISTING SEWER (SEE FIGURE S-11)
3. CONTRACTOR SHALL REMOVE AND PROPERLY DISPOSE ALL SEDIMENT FROM EXISTING STORM STRUCTURE.
4. CORE DRILL EXISTING STRUCTURE FOR PROPOSED CONNECTION
5. INSTALL RUBBER BOOT FOR NEW PIPE CONNECTION TO EXISTING MANHOLE
6. COORDINATE GAS AND ELECTRIC SERVICES TO BE RE-ROUTED WITH RESPECTIVE UTILITY COMPANY
7. INSTALL CUT-IN SLEEVE AND VALVE WITH VALVE BOX TO ISOLATE WATER MAIN TO BE REMOVED.
8. VERIFY LOCATION AND INVERT OF STORM AND SANITARY SEWER SERVICE CONNECTIONS WITH PLUMBING PLANS
9. YARD DRAIN (SEE DETAIL ST-80A)
10. REPAIR BROKEN FIRE HYDRANT. FIRE HYDRANT SHALL BE PAINTED WITH 2 COATS OF MAB "CAUTION YELLOW (7077)". COORDINATE WITH FIRE DEPARTMENT.
11. CONTRACTOR TO MAINTAIN PROPER VERTICAL SEPARATION BETWEEN PROPOSED WATER MAIN AND EXISTING STORM SEWER. SEE CROSSING DETAIL CR-1 ON SHEET C503.
12. CONTRACTOR TO MAINTAIN PROPER VERTICAL SEPARATION BETWEEN PROPOSED WATER MAIN AND EXISTING SANITARY SEWER. SEE CROSSING DETAIL CR-2 ON SHEET C503.
13. CONTRACTOR TO MAINTAIN PROPER VERTICAL SEPARATIONS BETWEEN PROPOSED WATER MAIN AND EXISTING STORM SEWER. SEE CROSSING DETAIL CR-3 ON SHEET C503.
14. CONTRACTOR TO MAINTAIN PROPER VERTICAL SEPARATIONS BETWEEN PROPOSED WATER MAIN AND PROPOSED SANITARY SEWER. SEE CROSSING DETAIL CR-4 ON SHEET C503.

"HOLEY MOLEY" SAYS CALL AT LEAST TWO FULL WORKING DAYS BEFORE YOU DIG. "JUST THE LAW."

1-800-382-5644
CALL TOLL FREE
1-800-428-5200
FOR CALLS OUTSIDE OF INDIANA

CAUTION

LOCATIONS OF ALL EXISTING UNDERGROUND UTILITIES SHOWN ON THIS PLAN ARE BASED UPON ABOVE GROUND EVIDENCE (including, but not limited to, manholes, inlets, valves, and marks made upon the ground by others) AND ARE SPECULATIVE IN NATURE. THERE MAY ALSO BE OTHER EXISTING UNDERGROUND UTILITIES FOR WHICH THERE IS NO ABOVE GROUND EVIDENCE OR FOR WHICH NO ABOVE GROUND EVIDENCE WAS OBSERVED. THE EXACT LOCATIONS OF SAID EXISTING UNDERGROUND UTILITIES SHOULD BE VERIFIED BY THE CONTRACTOR PRIOR TO ANY AND ALL CONSTRUCTION.

Revisions		
Mark	Date	Description
-	-	-
-	-	-
-	-	-
-	-	-
-	-	-

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(317) 844-6777 FAX (317) 704-6464
E-Mail cripe@cripe.biz
OWNER'S REPRESENTATIVE

UTILITY PLAN
WESTFIELD HIGH SCHOOL ADDITION
WESTFIELD WASHINGTON SCHOOLS
322 WEST MAIN STREET
WESTFIELD, IN 46074

CERTIFIED BY:

DAVID A. LACK
REGISTERED
PE 10000108
STATE OF
INDIANA
PROFESSIONAL ENGINEER

Date 02-06-09

COVERING
DESIGN

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Drawn By: —
Checked By: —
Quality Assurance: —
Scale: 1" = 20'
Sheet: C501
Date: 02-06-09
Project Number: 040338-20201

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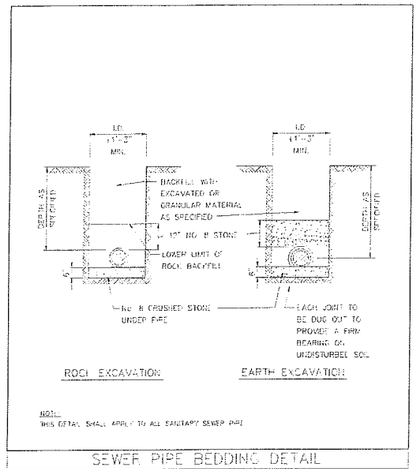
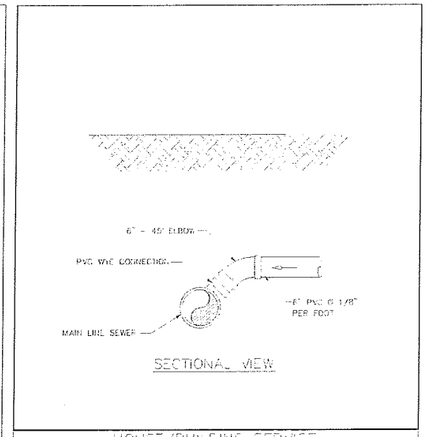


SEWER PIPE BEDDING DETAIL

TOWN OF WESTFIELD, INDIANA

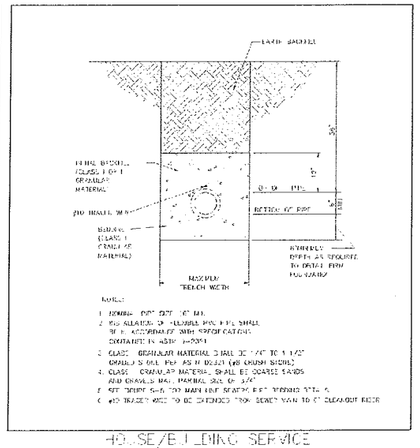
Brian Lyons Staff 10/9/06 DATE FIGURE S-6



HOUSE/BUILDING SERVICE CONNECTION DETAIL 2

TOWN OF WESTFIELD, INDIANA

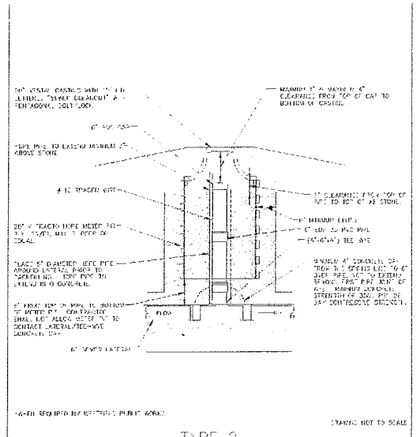
Brian Lyons Staff 10/9/06 DATE FIGURE S-11



HOUSE/BUILDING SERVICE BEDDING DETAILS

TOWN OF WESTFIELD, INDIANA

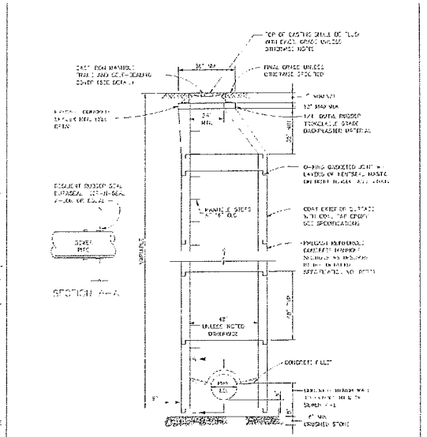
Brian Lyons Staff 10/9/06 DATE FIGURE S-13



TYPE 2 CLEAN-OUT DETAIL

TOWN OF WESTFIELD, INDIANA

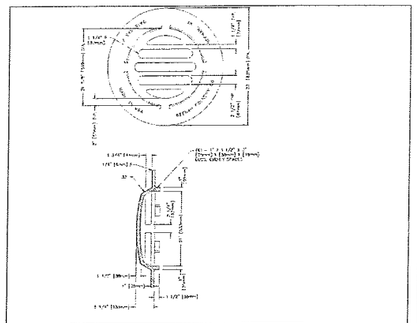
Brian Lyons Staff 10/9/06 DATE FIGURE S-10



STANDARD SANITARY MANHOLE DETAIL

TOWN OF WESTFIELD, INDIANA

Brian Lyons Staff 10/9/06 DATE FIGURE S-1



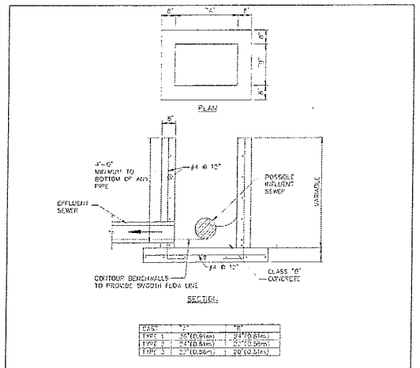
NEENAH	R-4342
EAST JORDAN	6489

* OR APPROVED BY WESTFIELD PUBLIC WORKS DEPARTMENT
** STORM SEWER CASTINGS MANHOLE COVERS, BEEHIVE INLETS, CURB INLETS OR OTHER APPROVED CASTINGS SHALL HAVE THE FOLLOWING PHRASES CAST IN RECESSED LETTERS TWO (2) INCHES IN HEIGHT:
A. "STORM SEWER"
B. "DRAINS TO RIVER" OR "DRAINS TO WATERWAY"
C. "DUMP NO WASTE"
D. OTHER PHRASES SHALL REQUIRE APPROVAL OF THE WESTFIELD PUBLIC WORKS DEPARTMENT

BEEHIVE CURB INLET CASTING

TOWN OF WESTFIELD, INDIANA

Brian Lyons Staff 4/10/06 DATE FIGURE ST-10



PIPE SIZE	"X"	"Y"
TYPE 1	30"(0.91m)	24"(0.61m)
TYPE 2	42"(0.91m)	30"(0.91m)
TYPE 3	57"(0.96m)	39"(0.91m)

NOTE
1. THESE DIMENSIONS ARE ALSO APPLICABLE TO TYPE "CA" CATCH BASINS (SEE FIGURE ST-13)
2. PRECAST INLETS AND CATCH BASINS SHALL BE CONSIDERED AN ACCEPTABLE ALTERNATE IF APPROVED BY THE WESTFIELD PUBLIC WORKS DEPARTMENT

INLET STRUCTURE TYPE 1A

TOWN OF WESTFIELD, INDIANA

Brian Lyons Staff 4/10/06 DATE FIGURE ST-11

PIPE SIZE (INCHES)	STRUCTURE DEPTH "A" (FT) (MIN. 4.0' TO INVERT)	STRUCTURES DEPTH THAN 15' FROM T/C TO INVERT	MAX. FLOW CAPACITY IN PIPE W/ FULLEST SPECIAL NOTE**	STEPS REQUIRED	CHAIN CASTING #5-250'W	CASTING BASIN TYPE
12 TO 18	4.0 - 7.0'	***	DEPENDS ON APPROVAL	NO	YES	YES
12 TO 18	7.0 - 10'	***	DEPENDS ON APPROVAL	NO	YES	YES
18 TO 27		10' - 20'	DEPENDS ON APPROVAL	YES	YES	YES
21 TO 27	4.0 - 20' (5' - 20')	***	DEPENDS ON APPROVAL	NO	YES	YES
12 TO 24	20' - 30'	***	DEPENDS ON APPROVAL	NO	YES	YES
24" OR LARGER	5'-30' (10'-30')	***	DEPENDS ON APPROVAL	NO	YES	YES
24" OR LARGER		30' - 50'	DEPENDS ON APPROVAL	YES**	YES	YES

* THIS IS THE MAXIMUM DEPTH THAT IS USED IN THE 2 YEAR TO 100 YEAR ROUTE

**PROVIDE ONE OUT CONE PIPE EFFECT STEPS IN THIS STRUCTURE

***SPECIAL NOTE: STRUCTURES DEEPER THAN 15' FROM T/C TO INVERT WILL BE A MIN. OF A 60W W-14-5 MANHOLE WITH STEPS. DEPENDS ON APPROVAL

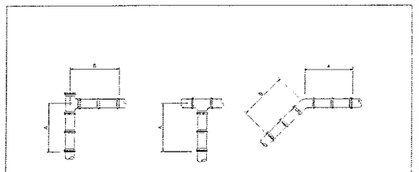
SPECIAL NOTE: STRUCTURES WILL BE DESIGNED FOR MAXIMUM FLOW IN PIPE

SPECIAL NOTE: FLOW MAY SLOPE STEPS TO BE USED AFTER STRUCTURE IS SET, TO MAKE ACCESS

STORM STRUCTURE SIZING TABLE

TOWN OF WESTFIELD, INDIANA

Brian Lyons Staff 4/10/06 DATE FIGURE S-15



NOTE
THE LENGTHS OF PIPE RESTRAINED JOINTS ARE BASED ON A COMPUTER SLIDE RULE, SUPPLEMENTED BY PIPE

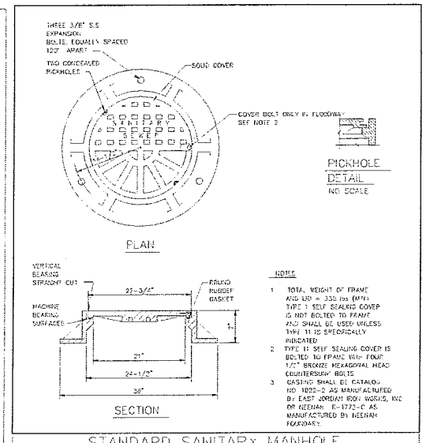
SIZE	A FLANGE	B BELL	C BELL	D BELL	E BELL
4"	12'-0"	17'-0"	17'-0"	6'-0"	7'-0"
6"	16'-0"	22'-0"	17'-0"	6'-0"	7'-0"
10"	18'-0"	27'-0"	19'-0"	6'-0"	8'-0"
12"	22'-0"	31'-0"	19'-0"	11'-0"	8'-0"
14"	25'-0"	36'-0"	21'-0"	12'-0"	9'-0"
16"	29'-0"	41'-0"	21'-0"	14'-0"	9'-0"
18"	32'-0"	46'-0"	21'-0"	15'-0"	9'-0"
20"	35'-0"	50'-0"	21'-0"	16'-0"	9'-0"
24"	41'-0"	58'-0"	24'-0"	18'-0"	10'-0"
30"	50'-0"	71'-0"	45'-0"	22'-0"	12'-0"
36"	58'-0"	82'-0"	45'-0"	24'-0"	14'-0"
42"	66'-0"	93'-0"	57'-0"	26'-0"	15'-0"

LENGTH IN FEET REQUIRED FOR RESTRAINED JOINTS.

RESTRAINED JOINT DETAILS

TOWN OF WESTFIELD, INDIANA

Brian Lyons Staff 10/9/06 DATE FIGURE W-3



STANDARD SANITARY MANHOLE FRAME AND COVER DETAILS

TOWN OF WESTFIELD, INDIANA

Brian Lyons Staff 10/9/06 DATE FIGURE S-3

Revisions			
Rev.	Date	Description	

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INDIANAPOLIS, INDIANA 46240
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UTILITY PLAN DETAILS

WESTFIELD HIGH SCHOOL ADDITION

WESTFIELD WASHINGTON SCHOOLS

322 WEST MAIN STREET
WESTFIELD, IN 46074

CERTIFIED BY:

DAVID A. LACY REGISTERED PE 10000126 STATE OF INDIANA PROFESSIONAL ENGINEER

Date: 02-06-09

COVERING

DESIGN

"NOTE WELL" THIS CALL AT LEAST TWO FULL WORKING DAYS BEFORE YOU DIG

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Checked By: —

Quality Assurance: —

Scale: 0 Scale: 1" = 1/4

Sheet: C502

Date: 02-06-09

Project Number: 040338-20201

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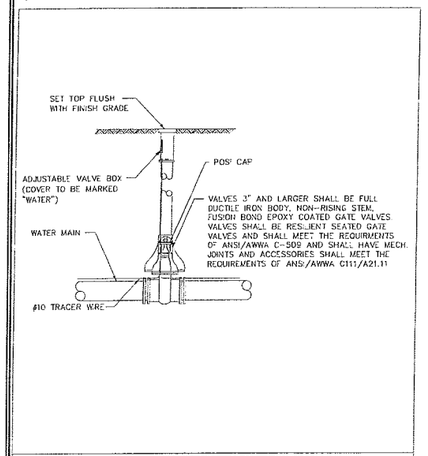
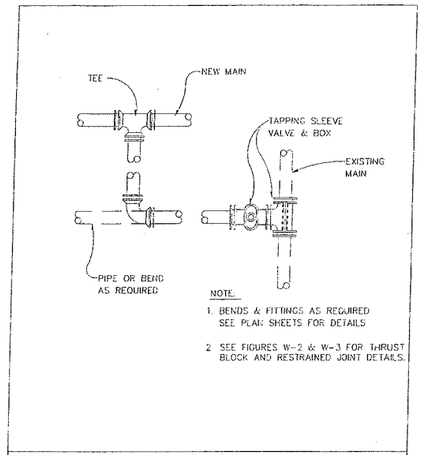


GATE VALVE AND BOX

TOWN OF WESTFIELD, INDIANA

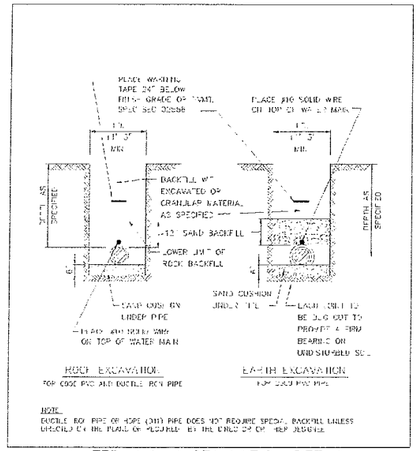
10/9/06 DATE FIGURE W-6



CONNECTION TO EXISTING MAIN

TOWN OF WESTFIELD, INDIANA

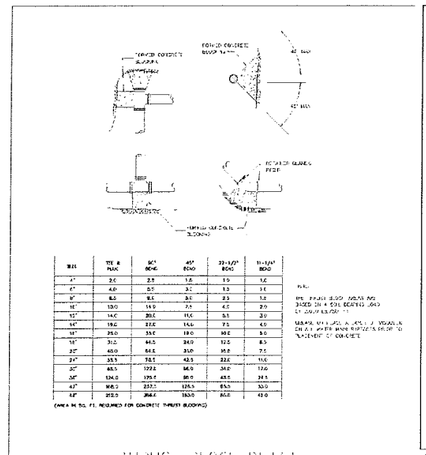
10/9/06 DATE FIGURE W-5



WATER MAIN INSTALLATION DETAIL

TOWN OF WESTFIELD, INDIANA

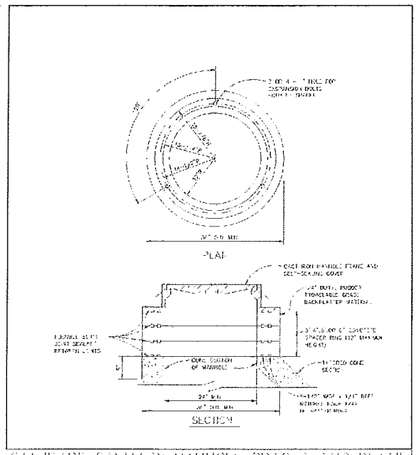
10/9/06 DATE FIGURE W



THRUST BLOCK DETAIL

TOWN OF WESTFIELD, INDIANA

10/9/06 DATE FIGURE W-2



STANDARD SANITARY MANHOLE SPACER RING DETAIL

TOWN OF WESTFIELD, INDIANA

FIGURE S-2

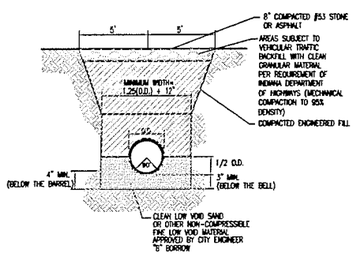
STRUCTURE DATA TABLE			
STRUCTURE (number)	TYPE (detail)	SIZE (DIA.) (feet)	CASTING (detail)
701	FIGURE ST-11	2'X2' BOX	FIGURE ST-10
702	FIGURE ST-11	2'X2' BOX	FIGURE ST-10
703	ST-80A	8"	ST-80A
704	ST-80A	8"	ST-80A
801	FIGURE S-1	4	FIGURE S-3
802	FIGURE S-1	4	FIGURE S-3

NOTES:

THE PIPE LENGTHS ARE FROM THE CENTER OF THE STRUCTURE TO THE CENTER OF THE STRUCTURE OR END OF PIPE END SECTION.

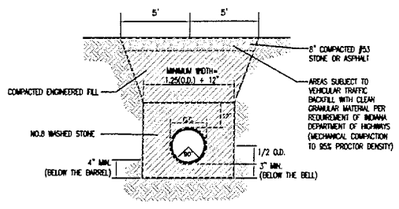
ST-71 STRUCTURE DATA TABLE

NO SCALE



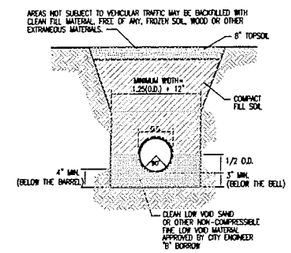
ST-32A RIGID PIPE BEDDING DETAIL (STORM)

NO SCALE CONCRETE PIPE AND CMP



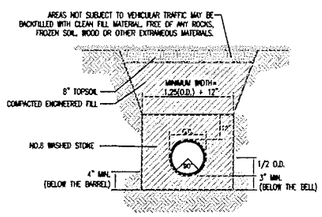
ST-33A FLEXIBLE PIPE BEDDING DETAIL (STORM)

NO SCALE PVC & HDPE



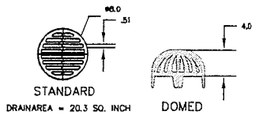
ST-32 RIGID PIPE BEDDING DETAIL (STORM)

NO SCALE CONCRETE PIPE AND CMP



ST-33 FLEXIBLE PIPE BEDDING DETAIL (STORM)

NO SCALE PVC & HDPE



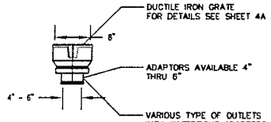
DRAINAREA = 20.3 SQ. INCH

CASTINGS ARE RATED FOR LIGHT WHEEL LOAD TRAFFIC

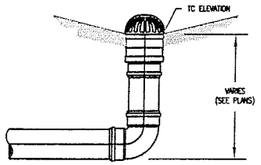
QUALITY: MATERIAL SHALL CONFORM TO ASTM A48 - CLASS 30B

PAINT: CASTINGS ARE FURNISHED WITH A BLACK PAINT

8" DUCTILE IRON GRATE



8" INLINE DRAIN



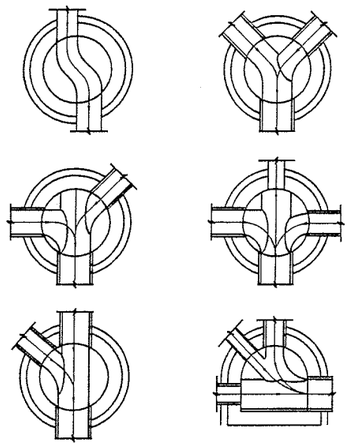
YARD INLET DETAIL

BEGINNING OF DRAIN LINE

ST-80A NYLOPLAST 8" YARD DRAIN DETAIL

NO SCALE

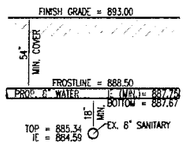
DETAILS PROVIDED BY:
Nyloplast America, Inc.
3150 Verona Avenue
Buford, Georgia 30518



SANITARY SEWER BENCH SLOPE = 1/2" PER FOOT

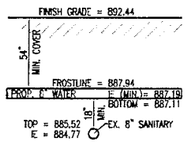
SA-33 STANDARD MANHOLE BENCHES

NO SCALE



CR-4 CROSSING DETAIL

NO SCALE



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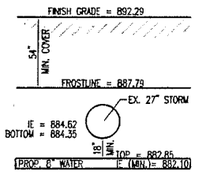

CR-2 CROSSING DETAIL

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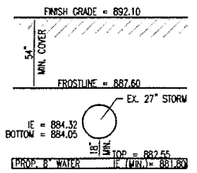

CR-1 CROSSING DETAIL

NO SCALE

Revisions			
Mark	Date	Description	

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3939 PRIORITY WAY SOUTH DRIVE SUITE 400
INDIANAPOLIS, INDIANA 46240
(317) 846-6601 FAX: 844-6464
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UTILITY PLAN DETAILS

WESTFIELD HIGH SCHOOL ADDITION

WESTFIELD WASHINGTON SCHOOLS

322 WEST MAIN STREET
WESTFIELD, IN 46074

CERTIFIED BY:

DAVID A. LACK REGISTERED PE 10000126 STATE OF INDIANA PROFESSIONAL ENGINEER

Date 02-06-09

COVERING

DESIGN

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Drawn By:

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Scale: 0 Scale: 1" = 10'

Sheet C503

Date 02-06-09

Project Number 040338-20201

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SECTION 02660 - WATER MAINS

PART 1 - GENERAL

1.1 DESCRIPTION

A. Scope: Furnish and install pipe, fittings, valves, hydrants and appurtenances necessary to complete work shown or specified

B. Codes, specifications and standards referred to by title or number in this specification shall be adhered to, and latest revisions shall apply in all cases

C. Definitions

1. Abbreviations
   a. ANSI - American National Standards Institute
   b. ASTM - American Society for Testing & Materials.
   c. AWWA - American Water Works Association
2. All pipe, fitting and valve sizes and references to pipe diameter on the drawings or in the specifications are intended to be nominal size or diameter and shall be interpreted as such

1.2 QUALITY ASSURANCE

A. Mark pipe, fittings, valves and hydrants according to the applicable specification or standard. Each length of pipe shall bear the name or trademark of the manufacturer, the location of the plant, and the date of manufacture. Each length shall likewise be marked to designate the class or strength of the pipe. The marking shall be made on the exterior or interior of the pipe barrel near the bell or groove end and shall be plainly visible. Pipe shall have permanently extruded stripes on three (3) or four (4) sides according to the following schedule

Water Main: Blue Stripes

B. The Contractor shall test and disinfect water mains constructed under this Contract, as specified in this Section

C. The Town shall collect samples of water from water mains constructed after the piping has been disinfected. The Town will submit the samples to the applicable regulatory agency for bacteriological analysis. Collection and submittal of these samples shall meet the requirements of

the applicable regulatory agency. If samples do not pass the requirements of the bacteriological analysis, the water main will be disinfected and sampled again. This procedure will be followed until the samples pass the analysis.

D. A performance test may be required by the Public Works Director, at any time, for each crew installing water mains. The Contractor shall perform these tests at no additional cost to the Owner. When required by the Public Works Director, the Contractor shall test a given section of water main installed by a given crew. The section shall be a continuous section of water main which can be isolated by valves shown on the drawings. The Contractor shall not install water mains in other sections until the first section has been successfully tested.

PART 2 - PRODUCTS

2.1 GENERAL

All pipe, fittings, valves, hydrants and appurtenances shall be as shown on the drawings or as required by the manufacturer's and ANSI/AWWA specifications. All pipe, fittings, valves, hydrants and appurtenances shall be new and unused.

2.2 BURIED WATER MAIN PIPE AND FITTINGS

A. Ductile Iron Water Mains (3" and Larger)

1. Pipe:
   a. Ductile iron pipe shall meet the requirements of ANSI/AWWA C151/A21.51-91. Design and manufacture pipe for the pressure class listed plus 100 psi surge pressure. Additionally, a safety factor of 2.0 and a depth of cover, indicated on the drawings or as required by the manufacturer's and ANSI/AWWA specifications, shall be included. Minimum thickness class shall be as follows:

Size Range	Pressure Class
4" – 12"	350
14" – 20"	250

   b. Pipe joints shall be push-on type. Joints shall meet the requirements of ANSI/AWWA C111/A21.11. Restrained joints shall be Lok-Ring, Lok-Fast, Lok-Tyte, or equal.
2. Fittings

   a. Fittings shall be ductile iron. Fittings for standard size pipe shall meet the requirements of ANSI/AWWA C110/A21.10-93. Compact or short body fittings 3 inches through 16 inches shall meet the requirements of ANSI/AWWA C153/A21.53-94. Design and manufacture fittings for a pressure rating of at least 150 psi.
   b. Fitting joints shall be mechanical joints or restrained push-on joints. Joints shall meet the requirements of ANSI/AWWA C111/A21.11. Thrust block all mechanical joints as indicated on the drawings or as required by the manufacturer's and ANSI/AWWA specifications. Pipe connecting to restrained joint fittings shall be restrained as indicated on the drawings or as required by the manufacturer's and ANSI/AWWA specifications.
3. Adapters
   a. Adapters from ductile iron water mains to flange joint valves or fittings shall be ductile iron. Adapters shall meet the requirements of ANSI/AWWA C110/A21.10-93. Design and manufacture adapters for a pressure class rating of 150 psi.
   b. Adapter ends connecting to ductile iron water mains shall be one of the following: plain end, push-on joint, mechanical joint or restrained push-on joint. Adapters with plain ends, push-on joints or mechanical joints may be used where restrained joints are not required. Adapters shall have restrained push-on joints where restrained joint piping is required, as indicated on the drawings. Mechanical joints and restrained push-on joints shall meet the requirements of ANSI/AWWA C111/A21.11. Restrained joints shall be Lok-Ring, Lok-Fast, Lok-Tyte or as approved by the Public Works Director.
   c. Adapter ends connecting to flange joint valves or fittings shall have joints complying with the specifications for the applicable valves or fittings.
4. Line the inside surfaces of all pipe, fittings and adapters with single layer cement mortar lining. Cement mortar lining and seal coating shall meet the requirements of ANSI/AWWA C104/A21.4-95. Coat the outside surfaces of all pipe, fittings and adapters with a bituminous coating, complying with ANSI/AWWA C151.
5. Gaskets for mechanical joints and push-on joints shall meet the requirements of ANSI/AWWA C111/A21.11.
6. Nuts and Bolts

   a. Nuts and bolts for mechanical joints shall be high strength, heat treated, alloy steel. Nuts shall be hexagon nuts, bolts shall be tee head bolts. Nuts and bolts shall meet the requirements of ANSI/AWWA C111/A21.11
   b. Nuts and bolts for restrained push-on joints shall meet the requirements of the joint manufacturer
7. Polyethylene encasement for ductile iron water mains shall be installed and shall meet the requirements of ANSI/AWWA C105/A21.5. Installation of the polyethylene encasement shall be omitted if written approval is made by the ductile iron pipe manufacturer and/or the Public Works Director. Contractor/Developer shall be required to provide soils testing results for corrosivity at no additional charge to the Town if omission of the polyethylene encasement is proposed

B. Polyvinyl Chloride Water Mains (3" to 8")

1. Pipe
   a. Polyvinyl chloride pipe shall meet the requirements of ANSI/AWWA C900, Class 150/DR18. Design and manufacture pipe for a working pressure of 150 psi plus 100 psi surge pressure. Additionally, a safety factor of 2.0 and a depth of cover, indicated on the drawings or as required by the manufacturer's and ANSI/AWWA specifications, shall be included
   b. Polyvinyl chloride pipe shall have ductile-iron-pipe-equivalent outside diameter
   c. Pipe joints shall be push-on type and meet the requirements of ANSI/AWWA C900. Do not use solvent-cement joints
2. Fittings
   a. Fittings shall be ductile iron and meet the requirements of ANSI/AWWA C110/A21.10. Design and manufacture fittings for a pressure rating of 150 psi
   b. Line the inside surfaces of fittings with cement mortar lining and bituminous seal coating shall meet the requirements of ANSI/AWWA C104/A21.4. Coat outside surfaces of fittings with bituminous coating. Outside coating shall meet the requirements of ANSI/AWWA C110/A21.10

   c. Fitting joints shall be mechanical joints. Mechanical joints shall meet the requirements of ANSI/AWWA C111/A21.11.
   d. Mark each fitting. Marking shall meet the requirements of ANSI/AWWA C110/A21.10
3. Adapters
   a. Adapters from polyvinyl chloride water mains to victaulic, flange joint valves or fittings shall be ductile iron. Adapters shall meet the requirements of ANSI/AWWA C110/A21.10. Design and manufacture adapters for a pressure rating of 150 psi.
   b. Line the inside surfaces of adapters with a single cement mortar lining. Cement mortar lining and seal coating shall meet the requirements of ANSI/AWWA C104/A21.4. Coat outside surfaces of adapters with bituminous coating, complying with ANSI/AWWA C110/A21.10.
   c. Adapter ends connecting to polyvinyl chloride water mains shall have plain ends or mechanical joints. Mechanical joints shall meet the requirements of ANSI/AWWA C111/A21.11.
   d. Adapter ends connecting to victaulic, flange joint valves or fittings shall have joints complying with the specifications for the applicable valves or fittings.
4. Gaskets
   a. Gaskets for polyvinyl chloride push-on joints shall meet the requirements of ANSI/AWWA C900
   b. Gaskets for mechanical joints shall meet the requirements of ANSI/AWWA C111/A21.11 and ASTM F477.
5. Nuts and bolts for mechanical joints shall be high strength, heat treated, alloy steel. Nuts shall be hexagon nuts, and bolts shall be tee head bolts. Nuts and bolts shall meet the requirements of ANSI/AWWA C111/A21.11.

C. High-density polyethylene (HDPE) for Water Mains (3" or larger)

1. Pipes: Polyethylene piping and fittings shall be made of a high density polyethylene pipe compound with extra high molecular weight that meets the requirements for Type III, Grade P345 Polyethylene Material as defined in ASTM D-1248 (PE 3408). The minimum pressure class/SDR rating acceptable shall be Class 160/SDR 11. The pipe shall be DIPS and shall have an interior diameter no less than the

piping that it is connected to.

2. Joints: Joints shall be of a heat fusion joining system. Pipe and fittings shall be thermal butt fusion, saddle fusion, or socket fusion in accordance with manufacturer recommended procedures and ASTM D-2161. At the point of fusion, the outside diameter and minimum wall thickness of the fitting shall match the outside diameter and minimum wall thickness specifications of ASTM D-1248 for the same size pipe

   Joining of the pipes and fittings shall be performed in accordance with ASTM D-2774. Depending upon the installation requirements and site location, joining shall be performed within or outside the excavation. Joints of the pipe sections shall be smooth on the inside and internal projection beads shall not be greater than 3/16 inch.

   The tensile strength at yield of the butt-fusion joints shall not be less than the pipe. A specimen of the pipe cut across the butt-fusion joints shall be tested in accordance with ASTM D-638

   The manufacturer shall provide fusion training. The contractor and the onsite joint inspector shall be trained by the manufacturer or manufacturer's authorized representative.

   The fusion equipment and operator shall be required to demonstrate successful field experience. Regarding fusion over 36" capability, the fusion unit shall be field tested for a period of five years and the fusion operator shall have pipe size experience of the same size pipe on this project for five years or longer

3. Fittings: All fitting shall be provided as indicated on the plans. HDPE Fittings shall be of the same material and class as the pipe and shall be manufactured by the manufacturer of the pipe. HDPE Elbows, tees, and wyes shall be manufactured by mitered fabrication. The manufacturer shall have a written specification for all standard mitered fittings, which establishes Quality Control criteria and tolerances. The manufacturer may be required to demonstrate its ability to produce product required by this specification.

   Mechanical joint anchor fittings (MJ Adapter or Harvey Adapter) shall be used to transition from ductile iron to HDPE and from HDPE to PVC. The fitting shall be stronger than the pipe in that when it is subjected to tensile stress the pipe will pull apart before the fitting will pull out and the pipe will blow before the fitting will rupture under pressure.

All pressure rated fittings shall be rated according to the manufacturer's written specifications, and clearly labeled on the fittings as such

2.3 PIPE AND FITTINGS SMALLER THAN 3-INCH

A. Pipe shall be Type K drawn copper and shall meet the requirements of ASTM B88. Cooper pipe must be used for all piping to the meter pit

B. Fittings and couplings shall be cast bronze and shall meet the requirements of ASTM B16.18. Construct and manufacture fittings and couplings for a pressure rating of 150 psi.

C. Unions shall be bronze and shall meet the requirements of ASTM B16.18. Design and manufacture unions for a pressure rating of 150 psi.

D. Flanges for connection of screwed joint pipe to flange joint valves or fittings shall be 125-16 cast iron, screwed companion flanges, complying with both ASTM A126 and ANSI B16.1.

E. Tape for screwed joints shall be teflon

F. Gaskets for flange joints shall be 1/16-inch thick, full face and conform to ANSI/AWWA C111/A21.11. Gaskets shall be rubber or as approved by the Public Works Director.

G. Bolts for flange joints shall be steel, heavy hexagon head machine bolts. Nuts shall be steel, semi-finished, heavy hexagon nuts. Nuts and bolts shall meet the requirements of ASTM A307 for Grade B and be zinc-coated alloy steel.

2.4 VALVES

A. Butterfly Valves

1. Butterfly valves and operators shall meet the requirements of AWWA Standard C504. Valves and operators shall be Class 150B
2. Buried butterfly valves shall have mechanical joints. Mechanical joints shall meet the requirements of AWWA C111. Butterfly valves installed above ground or in structures shall have flange joints as specified in AWWA Standard C504. Nuts, bolts, and gaskets for flange joints shall meet the requirements of ANSI/AWWA C110/A21.10. Nuts and bolts shall be cadmium plated. Gaskets shall be full face and shall be red rubber, or equal

3. Each buried butterfly valve shall have a manual operator and a 2-inch operating nut. Valve opening direction shall be consistent with operation of existing valves in the waterworks in which the valves are installed, unless otherwise directed by the Engineer.
4. Each butterfly valve installed above ground or in a structure shall have a manual operator and handwheel

B. Gate Valves

1. Buried gate valves 4-inches and larger shall be full ductile iron body, epoxy fusion bonded inside and out, non-rising stem gate valves. Valves shall meet the requirements of ANSI/AWWA C500 or C509 and have mechanical joint ends. Mechanical joints and joint accessories shall comply with ANSI/AWWA C111/A21.11. Valve opening direction shall be consistent with operation of existing valves in the waterworks where the valves are installed, unless otherwise directed by the Public Works Director.
2. Three-inch buried gate valves shall be full ductile iron body, epoxy fusion bonded inside and out, non-rising stem gate valves. Valves shall meet the requirements of ANSI/AWWA C500 or C509; except, ends shall be screwed. Screwed ends shall conform to ANSI B16.3. Valve opening direction shall be consistent with operation of existing valves in the waterworks where the valves are installed, unless otherwise directed by the Public Works Director
3. Gate valves 4-inches and larger installed above ground or in structures shall be full ductile iron body, epoxy fusion bonded inside and out, outside screw and yoke gate valves. Valves shall correspond to ANSI/AWWA C500 or C509. Outside screw and yoke gate valves shall have flange joint ends and malleable iron handwheels. Flange joints and accessories shall be as specified in ANSI/AWWA C110/A21.10. Nuts and bolts shall be zinc-coated alloy steel. Gaskets shall be full face and rubber, or as approved by the Public Works Director.
4. Gate valves smaller than 4-inch installed above ground or in structures shall be bronze, 125 lb. S.W.P. double disc, screwed-in bonnet, rising stem, inside screw gate valves with screwed ends and malleable iron handwheels. Valves shall meet the requirements of federal specifications WASTEWATER-V-54d for Class A, Type III Valves

C. Buried valves 2-inch and smaller shall be curb stops. Curb stops shall meet the applicable requirements of ANSI/AWWA C800, ASTM B-62 for 85-5-5-5 composition bronze, and USAS B2.1. Curb stops shall be Mueller H-10283, Ford B11 Series, or as approved by the Public Works Director.

D. Tapping Valves

1. Tapping valves shall comply with both ANSI/AWWA C500 or C509 and have flange mechanical joint ends. Double disc gate valve gates, gate rings and body-seat rings shall be oversized to permit entry and exit of tapping machine cutters.
2. Valve end connecting to tapping sleeve shall have a flange for bolting to the sleeve. The flange shall have a tongue which fits a recess in the sleeve. Tongues shall meet the requirements of MSS SP-60. Resilient seated gate valves having a port diameter equal to or exceeding 1/4 inch over nominal diameter shall not require a tongue. Flange dimensions and drilling shall meet the requirements of ANSI B16.1. Nuts, bolts, and gaskets for flange joints shall meet the requirements of ANSI/AWWA C110/A21.10-93. Nuts and bolts shall be zinc-coated alloy steel, and gaskets shall be rubber, or as approved by the Public Works Director. Mechanical joints and accessories shall meet the requirements of ANSI/AWWA C111/A21.11. A full nominal diameter cutter shall be used for tapping.
   Tapping valves 14-inch and smaller shall be installed vertically. Tapping valves 16-inch and larger shall be installed horizontally and shall have bypass valves. Tapping valves installed horizontally shall have rollers and tracks. Valves 16-inch and larger shall have gear operators with enclosed gear cases suitable for buried service. Gear cases shall be extended type or totally enclosed type. Extended type gear cases shall have bolted side plates to cover stem and stuffing box.

E. Air and Vacuum Valves. Air and vacuum valves shall be as follows:

Size	Specification
½"	Apco No. 141WD, Val-Matic 100DWS, or equal
1"	Apco No. 142WD, Val-Matic 101DWS, or equal
2"	Apco No. 144WD, Val-Matic 102DWS, or equal
3"	Apco No. 146WD, Val-Matic 103DWS, or equal
4"	Apco No. 1604/152, Val-Matic 104DWS, or equal
6"	Apco No. 1606/153, Val-Matic 106DWS, or equal

2.5 VALVE BOXES

A. Valve boxes for butterfly valves and gate valves shall be cast iron. Valve boxes shall be two piece or three piece type. Each two piece box shall be complete with bottom section, top section and cover. Each three piece box shall be complete with base, center section, top section and cover. Valve boxes shall be extension type with slide or screw type adjustment.

Each base and bottom section shall be the proper size for the valve served. Each valve box assembly shall be the proper length for the valve served. The minimum thickness of metal shall be 3/16-inch. Cast the word "WATER" in each valve box cover

2.6 FIRE HYDRANTS

A. Fire hydrants shall be dry-barrel, compression shutoff, traffic model and comply with AWWA C502. Main valve size shall be 5-1/4 inch. Inlets shall be 6-inch mechanical joint. Each hydrant shall have two 2-1/2-inch nozzles and one 5-inch Storz pumper nozzle. Nozzle threads and hydrant opening direction shall be consistent with existing fire hydrants in the waterworks in which the fire hydrants are installed, unless otherwise directed by the Public Works Director. Each hydrant shall be the proper length for the water main to which the hydrant is connected. Fire hydrant coating shall meet the requirements of AWWA C502. Fire hydrants shall be MAB Fire Protection Red (7068), within the Westfield Washington Fire Department jurisdiction or MAB Caution Yellow (7077), within the Noblesville Fire Department jurisdiction. Hydrants shall be Model No A423, as manufactured by Mueller Company

B. Fire Hydrant Placement – Fire Hydrants shall be placed no farther apart than 300 feet in all residential subdivisions, subdivision sections, and other residential areas in which dwelling density meets or exceeds three dwelling units per gross acre. Fire hydrants shall be placed no further apart than 300 feet in all Industrial, Business, and Commercial areas, and all Industrial, Business, and Commercial uses. Such requirement shall be in full force and effect unless explicitly exempted by the Chief of the local fire department. For residential uses with densities less than three dwelling units per gross acre, the requirements as established in Table No. III-B-A of the Uniform Fire Code shall apply. Where there is any ambiguity or dispute concerning the interpretation of this requirement, the decision of the Chief of the local fire department shall prevail subject to appeal

2.7 SPRINKLER SYSTEMS

Multi-family developments, duplexes, and hotels/motels shall be required to have sprinkler systems installed in the attics of said structure as approved by the Chief of the local fire department. Such requirement shall be in full force and effect unless explicitly exempted by the Chief of the local fire department. Where there is any ambiguity or dispute concerning the interpretation of this requirement, the decision of the Chief of the local fire department shall prevail subject to approval.

2.8 TAPPING SLEEVES

A. Tapping sleeves shall be stainless steel split sleeves. Each sleeve shall have a branch connection with a flange end. The inside diameter of each branch shall be over-sized to permit entry and exit of tapping machine cutters. Each flange shall have a recess to center a tapping valve. Recesses shall meet the requirements of MSS SP-60. Flange dimensions and drilling shall meet the requirements of ANSI B16.1. The sleeve dimensions shall be such that the sleeves will not leak when installed on cast iron, ductile iron, or polyvinyl chloride pipe with outside diameters shown in ANSI/AWWA Standards

B. Tapping sleeves for 4-inch through 16-inch pipe shall be mechanical joint type. Design and manufacture tapping sleeves for a working pressure of 200 psi.

C. Tapping sleeves for 18-inch and larger pipe shall be mechanical joint type. Design and manufacture tapping sleeves for a working pressure of 150 psi.

2.9 TAPPING SADDLES

A. Design and manufacture tapping saddles for a working pressure of 200 psi. Saddle bodies shall be stainless steel. Saddle straps shall be corrosion resistant steel alloy. Saddle gaskets shall be positively confined O-ring gasket. The sleeve dimensions shall be such that the sleeves will not leak when installed on cast iron, ductile iron, or polyvinyl chloride pipe with outside diameter shown in ANSI/AWWA Standards.

B. Each saddle used for making a wet connection shall have a branch connection with a flange end. The inside diameter of each branch shall be oversized to permit entry and exist of tapping machine cutters. Each flange shall have a recess to center a tapping valve. Recesses shall meet the requirements of MSS SP-60. Flange dimensions and drilling shall meet the requirements of ANSI B16.1.

C. Each saddle used for making a dry connection shall have a branch connection with a flange or mechanical joint end. Flange dimensions and drilling shall meet the requirements of ANSI B16.1. Nuts and bolts for flange joints shall meet the requirements of ANSI/AWWA C110/A21.10 and be zinc-coated alloy steel. Gaskets shall comply with ANSI/AWWA C110/A21.10, be full face and rubber, or as approved by the Public Works Director. Mechanical joints and accessories shall meet the requirements of ANSI/AWWA C111/A21.11.

D. Gaskets used to seal joints between saddle bodies and tapped pipes shall be O-ring type, circular in cross section, and made of natural or synthetic rubber with a Durometer Hardness of 70 ± 5.

2.10 FLANGE-MECHANICAL JOINT ADAPTERS

Flange-mechanical joint adapters shall be Dresser Style 127, Smith-Blair Type 912 or as approved by the Public Works Director.

2.11 AIR AND VACUUM VALVE CHAMBERS

A. Air and vacuum valve chambers shall be 4-foot diameter precast concrete manhole barrels with precast concrete flat slab tops. Precast manhole barrels shall meet the requirements of ASTM C478

B. Air and vacuum valve chamber access frames and cover shall be Neenah R-1915-G, or equal. Cast the word "WATER" in each cover.

2.12 WATER SERVICES

A. Pipe shall be seamless copper tubing and shall meet the requirements of ASTM B88, Type "K."

B. Fittings and Couplings: Couplings for copper tubing shall be copper to copper or copper to iron, as required, and shall meet the applicable requirements of AWWA C800, ASTM B-62 for 85-5-5-5 composition bronze, and ANSI B2.1. Fittings and couplings shall be Ford Products, Pack Type Compression Joints, or equal.

C. Service connections made to a PVC water main shall be made using a stainless steel saddle with a corporation stop

PART 3 - EXECUTION

3.1 INSPECTION

Inspect water main pipe, fittings, valves, hydrants, and appurtenances prior to installation. Promptly remove damaged or unsuitable products from the job site. Replace damaged or unsuitable products with undamaged and suitable products.

3.2 LAYING OF WATER MAINS

A. Proper tools and facilities shall be provided and used by the Contractor for safe working conditions

B. Lay and maintain pipe to the lines and grades shown on the drawings or to the minimum depth specified in this Article. Install fittings, valves and hydrants in the locations shown on the drawings.

C. When the exact location of buried utilities is unknown and piping is to be constructed parallel and close to said utilities, adjust the alignment of the piping to least interfere with these utilities. This applies unless otherwise shown on the drawings or specified by the Public Works Director.

D. All crossings of water mains and sanitary sewers or storm sewers must be in accordance with 327 IAC 8-3.2-9. Water mains shall be laid at least 10 feet horizontally from any existing sanitary sewer, sewage force main, or storm sewer. The distance shall be measured from outside edge of water main to outside edge of the sanitary sewer or storm sewer. Water mains crossing sanitary sewer, sewage force mains, or storm sewer shall be laid to provide a minimum vertical distance of 18 inches between the outside of the water main and the outside of the sanitary sewer, force main, or storm sewer. The 18-inch separation shall apply whether the water main is over or under the sewer or force main. Lay water mains at crossings of sewers and force mains so a full length of water main pipe is centered on the sewer or force main whenever possible

E. No watermains shall be within eight (8) feet of a sanitary sewer manhole, a storm sewer manhole, or a drainage grate support structure as measured from the outside edge of the water main to the outside edge of the sanitary sewer manhole, storm sewer manhole, or drainage grate support structure, per 327 IAC 8-3.2-9.e

F. All piping shall be laid at a depth that provides at least 4'-6" of cover. Cover shall be measured as the vertical distance from the top of the pipe to the finish grade elevation

G. Laying of water mains shall meet the requirements of ANSI/AWWA C600, unless otherwise specified in this Section

H. Shape the bottom of the trench to give uniform circumferential support of the lower quarter of each pipe

I. Do not lay pipe in water or when the trench or weather conditions are unsuitable for proper installation

J. As each length of pipe is placed in a trench, joint the pipe being laid to the previously laid pipe. Bring the pipe to correct line and grade. Secure the pipe in place with bedding tamped under the pipe. Tamp bedding up to the centerline of the pipe

K. Deflection from a straight line or grade shall not exceed the limits specified in this Section. If the alignment requires joint deflections in excess of the allowable deflection per joint, furnish and install fittings or a sufficient number of shorter lengths of pipe.

L. Provide thrust restraint at horizontal and vertical deflection fittings and at tees, plugs, tapping sleeves and tapping saddles. Restraint shall be concrete thrust blocking or restrained joint piping

M. Where concrete thrust blocking is used, cover the fitting to be blocked with visqueen or a heavy duty grease to prevent adherence of the concrete to the fitting

N. Block the open end of the pipe at the close of each day's work to prevent contamination from dirt or rain water and entry of any animal or foreign material.

O. Lower pipe, fittings, valves and hydrants into the trench by hand, hoists or ropes or other suitable tools or equipment that will not damage products, coatings or linings. Do not drop or dump pipe, fittings, valves, or hydrants into the trench.

P. Water main designs that require crossing a county legal drain shall be approved and constructed per the latest standards of the Hamilton County Surveyor's Office.

3.3 SETTING VALVES, VALVE BOXES AND FIRE HYDRANTS

A. Clean the interiors of valves and hydrants of foreign matter before installation. Tighten stuffing boxes. Inspect valves and hydrants in opened and closed positions to ensure all parts are in working condition

B. Set valves and valve boxes plumb. Center valve boxes on the valves or valve operators. Locate valves outside the area of roads and streets where feasible. Tamp backfill around each valve box to a distance of 4 feet on all sides of the box or to the undisturbed trench face if less than 4 feet.

C. Set hydrants plumb with the pumper nozzle facing the street. The centerline of the outlet nozzles shall be at least 18 inches or at most 30 inches above finished grade at a hydrant. Install hydrant extensions where required to bring hydrant to proper elevation. Set each hydrant upon a slab of stone or concrete not less than 4 inches thick and 15 inches square. Wedge the side of each hydrant opposite the pipe connection against the undisturbed trench face to prevent the hydrant from blowing off the branch connection. Compact the backfill around each hydrant to finish grade. Furnish and install a gate valve and valve box in each hydrant branch connection. In the field, (Westfield) apply two coats of MAB Fire Protection Red (7068), (Noblesville) MAB Caution Yellow (7077) to the fire hydrants installed. All installed hydrants meeting the requirement of Section 2660; Para. 2.6 (a), shall be painted by the contractor either MAB

Fire Protection Red (7068), within the Westfield Washington Fire Department jurisdiction or MAB Caution Yellow (7077), within the Noblesville Fire Department jurisdiction. A three (3) foot clear space shall be maintained around the circumference of fire hydrants except as otherwise required or approved.

D. All inline water valve box caps should be painted blue. All hydrant valve caps should be painted MAB Fire Protection Red (7068)

3.4 CONNECTING TO EXISTING MAINS

A. The Contractor shall locate and verify exact size of all existing mains, both horizontally and vertically. Additionally, allow adequate time, after location and prior to making new connections, for changes in the connection location and size. Backfill excavation immediately after main is located and measured.

B. Make each wet connection with a tapping valve and tapping sleeve. Install and hydrostatically test each tapping valve and tapping sleeve assembly prior to tapping existing water main. Inspect each tapping valve prior to tapping existing water main. Open and close tapping valves, and inspect tapping valves in opened and closed positions to ensure all parts are in working condition. Inspect each tapping valve immediately before connecting tapping machine to ensure the tapping valve is open. Install watertight plug on the tapping valve outlet and backfill excavation if existing water main is not tapped within 48 hours after installing tapping valve and tapping sleeve or tapping saddle assembly. Install watertight plug on the tapping valve outlet and backfill excavation if new water main is not connected to tapping valve within 48 hours after making tap in existing water main.

C. Make each dry connection with fittings and valves indicated on the drawings. Furnish and install sleeves required to complete connections. All required pipe, fittings, valves, tools, and equipment shall be at the connection site prior to starting connection. Wash interior of new pipe, fittings, and valves with a solution containing 50 mg/l of chlorine prior to making connection. Make connections at night and on weekends when required. The Owner will operate existing valves. Install sufficient water main and restrain joints so existing water mains can be up in service immediately after connection is completed. Inspect joints and eliminate leaks immediately after connection is completed and existing mains are put in service. Install watertight plugs on open ends of pipe and valves, and backfill excavation if new water main is not connected to dry connection within 48 hours after completing dry connection.

3.5 JOINTING

A. Ductile Iron Push-on Joints

1. Pipe must be cleaned and installed as specified by the manufacturer and ANSI/AWWA C600 requirements. Additionally, all lumps, blisters, excess bituminous coating and foreign material must be removed from the bell and spigot end of each pipe
2. For restrained push-on joints, move the loose retainer ring into position against the retainer bar on the spigot end of the pipe being installed. Loosely assemble the joint bolts and nuts
3. Deflect pipe after jointing, if deflection is required. The amount of deflection shall not exceed the limits shown in the following table:

Pipe Size	Maximum Deflection Angle	Maximum Deflection Based Upon 18-Foot Pipe Length
4"	5°	18-1/2"
6"	5°	18-1/2"
8"	5°	18-1/2"
10"	5°	18-1/2"
12"	5°	18-1/2"

4. For restrained push-on joints, pull the nuts to a uniform tightness by hand or with a short wrench. Do not pull the spigot of the pipe being installed against the back of the bell of the receiving pipe. Engage at least a full nut on each bolt when joint deflection is required

B. Polyvinyl Chloride Push-on Joints

1. Pipe must be cleaned and installed as specified by the manufacturer's requirements. Additionally, all joints must be free of all foreign material
2. Deflect the pipe after jointing, if deflection is required. The amount of deflection shall not exceed the limits recommended by the pipe

C. Mechanical Joints

1. Pipe must be cleaned and installed as specified by the manufacturer and AWWA C600 requirements. Additionally, all

lumps, blisters, excess bituminous coating and foreign material must be removed from the bell and spigot end of each pipe
2. Evenly tighten the nuts using a torque wrench. The torque shall be within the range listed in the following table:

Pipe Size	Bolt Size	Torque Range
4" thru 24"	3/4"	75 to 90 ft.-lb

3. Deflect pipe, fittings or valves after jointing, if deflection is required. The amount of deflection shall not exceed the limits shown in the following table

Pipe Size	Maximum Deflection Angle	Maximum Deflection Based Upon 18-Foot Pipe Length
4"	8° - 18'	31"
6"	7° - 7'	27"
8"	5° - 21'	20"
10"	5° - 21'	20"
12"	5° - 21'	20"
14"	3° - 35'	13-1/2"
16"	3° - 35'	13-1/2"
18"	3° - 0'	11"
20"	3° - 0'	11"
24"	2° - 23'	9"

D. Shouldered Type Joints

1. Pipe must be cleaned and installed as specified by the manufacturer and AWWA C600 requirements. Additionally, all lumps, blisters, excess bituminous coating and foreign material must be removed from the bell and spigot end of each pipe.
2. The tightening torque shall not exceed the limits recommended by the joint manufacturer
3. Deflect pipe, fittings, adapters or valves after jointing, if deflection is required. The amount of deflection shall not exceed the limits recommended by the joint manufacturer.

E. Threaded Joints

1. Pipe must be cleaned and installed as specified by the manufacturer and AWWA C600 requirements. Additionally, all lumps, blisters, excess bituminous coating and foreign material must be removed from the bell and spigot end of each pipe.

2. Do not overtighten joints.
3. Backing off made-up threaded joints to facilitate fit-up or alignment will not be permitted

F. Flange Joints

1. Pipe must be cleaned and installed as specified by the manufacturer and AWWA C600 requirements. Additionally, all lumps, blisters, excess bituminous coating and foreign material must be removed from the bell and spigot end of each pipe
2. Do not overtorque nuts and bolts

3.6 RESTRAINING AND SUPPORTS

A. Thrust Blocking

1. Construct thrust blocks of concrete having a 28-day compressive strength of at least 2,000 psi.
2. Lubricate fitting surfaces to prevent bonding between fittings and thrust blocks
3. Construct thrust blocks between fittings and undisturbed soil. The area of thrust blocking bearing on undisturbed soil shall be at least the area indicated on the drawings. Construct thrust blocking so pipe and joints are accessible for repair and joint flexibility is not impaired.

B. Restrained joint piping shall be as specified in this Section. Distance from fitting to end of restraint shall not be less than that indicated on the drawings.

C. Mechanical Joint Rod Restraint

1. Mechanical joint rod restraint shall be from fitting to fitting.
2. The number of rods shall conform to the following table:

Pipe Size	Rod Size	Minimum No. of Rods
4"	3/4"	2
6"	3/4"	2
8"	3/4"	4
10"	3/4"	4
12"	3/4"	6
14"	3/4"	6
16"	3/4"	8

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CITY OF WESTFIELD SPECIFICATIONS
WESTFIELD HIGH SCHOOL ADDITION
WESTFIELD WASHINGTON SCHOOLS
322 WEST MAIN STREET
WESTFIELD, IN 46074

David A. Lach, PE 10000126, State of Indiana, Professional Engineer
Date 02-06-09

Sheet C901
Date 02-06-09
Project Number 040338-20201

18"	3/4"	8
20"	3/4"	10
24"	3/4"	16

D. Pipe Supports

1. Furnish and install supports required to hold pipe, fittings and valves at the lines and grades indicated on the drawings, without causing strain upon pipe, fittings and valves.
2. Support piping by suitable saddle stands, concrete piers or hangers.
3. Locate supports where necessary, at least 8 feet on center.

3.7 AIR AND VACUUM VALVE CHAMBERS

A. Install air and vacuum valve chambers as indicated on the drawings.

B. Mortar for joints and plastering shall consist of one part Portland Cement and two parts fine sand. Lime may be added to the mortar used for brick work. Add lime in an amount of not more than 20% of the volume of cement. Complete fill joints between precast chamber sections. Joints shall be smooth and free from surplus mortar on the inside surface of the chamber. Plaster brick at the top of chambers with 1/2-inch of mortar.

C. Set frames and covers so the top of the cover will be flush with finished grade.

D. Vent air and vacuum valve outlets to the surface. Terminate vent outlets 3 feet above finished grade. Screen vents to prevent the entrance of insects. Paint air and vacuum valve vents yellow.

3.8 HYDROSTATIC TEST

A. Hydrostatic tests shall be performed on all water mains installed. The Contractor shall make arrangements with the Town Engineer and/or Town Representative for scheduling each test. Each test shall be performed on the day mutually agreed upon and in the presence of the Town Engineer and/or Town Representative.

B. The Contractor shall furnish equipment, temporary piping, pumps, fittings, gauges, and operating personnel necessary to conduct the tests. Water for testing may be obtained from the Owner.

C. The water mains may be tested in sections between valves when there is one or more intermediary valves in a water main.

D. Test procedures shall meet the requirements of AWWA Standard C600.

E. Each section of water main shall be complete, and thrust blocks shall have been in place for not less than 10 days prior to being tested.

F. Expel all air from the water main test section during the filling of the main and prior to the application of test pressure. Tap the water main at high points, if necessary, to release all air from the water main. Plug taps after the test is successfully completed. Plugs shall be watertight.

G. Test water mains at a static pressure of 150 pounds per square inch over a period of two consecutive hours. The test will be considered successful when the pressure drop over the test period is 5 pounds per square inch or less. If the pressure drop exceeds 5 pounds per square inch, repair leaks and repeat the test until the pressure drop over the test period is 5 pounds per square inch or less.

3.9 FLUSHING

A. Flush water mains and fire hydrants prior to disinfection. Flush water mains with a flushing velocity of at least 2.5 feet per second. Following are flows required to provide a flushing velocity of 2.5 feet per second:

Pipe Size	Inside Diameter	Flow at a Velocity of 2.5 Feet per Second
½"	0.622"	2.4 gpm
¾"	0.824"	4.2 gpm
1"	1.05"	6.8 gpm
1¼"	1.38"	12 gpm
1½"	1.61"	16 gpm
2"	2.07"	27 gpm
2½"	2.47"	38 gpm
3"	3.07"	58 gpm
4"	4"	98 gpm
6"	6"	220 gpm
8"	8"	390 gpm
10"	10"	620 gpm
12"	12"	880 gpm
14"	14"	1,200 gpm
16"	16"	1,600 gpm
18"	18"	2,000 gpm
20"	20"	2,500 gpm
24"	24"	3,600 gpm

B. Flush water mains and hydrants until the water discharged is clear.

3.10 DISINFECTION

A. Disinfect all new and repaired water mains prior to placing them in service. Disinfect pipe, fittings, valves and hydrants with a chlorine solution containing 50 mg/l ± 5 mg/l of available chlorine.

B. The chlorinating material shall be calcium hypochlorite. Calcium hypochlorite shall have 70% available chlorine by weight, and sodium hypochlorite shall have 5.25% to 14.7% available chlorine. Placing chlorine tablets in the mains during construction is not an acceptable method of disinfection. The following table shows the quantity of hypochlorite required to produce 50 mg/l of available chlorine per 100 feet of pipe.

Pipe Size	Inside Diameter	Chlorine Gas	Pounds Cal Hycl (70%)	Ounces Cal Hycl (70%)
½"	0.622"	0.00066	0.0094	0.015
¾"	0.824"	0.0012	0.0017	0.026
1"	1.05"	0.0019	0.0027	0.043
1¼"	1.38"	0.0032	0.0045	0.074
1½"	1.61"	0.0044	0.0063	0.10
2"	2.07"	0.0073	0.010	0.17
2½"	2.47"	0.010	0.015	0.24
3"	3.07"	0.016	0.023	0.37
4"	4"	0.027	0.039	0.62
6"	6"	0.061	0.087	1.4
8"	8"	0.11	0.16	2.5
10"	10"	0.17	0.24	3.9
12"	12"	0.24	0.35	5.6
14"	14"	0.33	0.48	7.6
16"	16"	0.44	0.62	10
18"	18"	0.55	0.79	13
20"	20"	0.68	0.97	16
24"	24"	0.98	1.40	22
30"	30"	1.5	2.2	34
36"	36"	2.2	3.1	50
42"	42"	3.0	4.3	69
48"	48"	3.9	5.6	90
54"	54"	5.0	7.2	110

C. Tap water mains where required to inject chlorine solution into all pipe, fittings, valves and hydrants installed and repaired. Inject chlorine solution into water mains. Leave the chlorine solution in the water mains for 24 hours or longer. Open and close valves in lines being disinfected several times during contact period. Following the contact period, flush

the water mains with potable water until the chlorine residual is 1.0 mg/l or less.

D. Bacteriological Tests - The water main shall be tested for bacteriological quality after disinfection and final flushing. Two or more successive sets of bacteriologically satisfactory samples taken at 24-hour intervals must be recorded before the facilities are released for use. Bacteriological testing shall meet the requirements of the applicable regulatory agency. Disinfection shall be repeated if the piping is not bacteriologically acceptable. Repeat disinfection and testing until the mains are approved for service by the applicable regulatory agency.

E. Hose connections on fire hydrants shall not be used for collecting samples. Contact the applicable regulatory agency for sampling criteria and procedures.

F. The time for disinfection, bacteriological testing, and approval of the main for service shall be included in the contract time.

G. The Contractor shall be responsible for disposal of chlorinated disinfection waters. If the water is discharged in an open channel or storm sewer, the Contractor shall dechlorinate the disinfection waters to 0.05 mg/L of total chlorine.

3.11 COMPLETION SCHEDULING

Complete water mains as they are installed. Test, flush, sterilize, and place in service each part of the water main which is complete and can be placed in service without preventing work to continue on uncompleted parts of the new water mains.

SECTION 02731 - GRAVITY SANITARY SEWERS

PART 1 - GENERAL

1.1 GENERAL

A. This section covers all work necessary for the installation of gravity sanitary sewers and related items complete, including manholes, junction chambers, diversion chambers, house services, and miscellaneous concrete structures.

B. Sewer pipe shall be the size shown on the drawings and shall meet all requirements of these specifications and 327 IAC 3.

C. If a material type is shown on the drawings, that material shall be used in the installation unless otherwise noted and as approved by Westfield Public Works.

1.2 PIPE MARKING

Each length of pipe shall bear the name or trademark of the manufacturer, the location of the plant, and the date of manufacture. Each length shall likewise be marked to designate the class or strength of the pipe. The marking shall be made on the exterior or interior of the pipe barrel near the bell or groove end and shall be plainly visible. Pipe shall have permanently extruded stripes on three (3) or four (4) sides according to the following schedule:

Sanitary Sewer: Green Stripes

1.3 SUBMITTALS

Before construction and preferably before fabrication, the Contractor shall submit to the Westfield Public Works Department for approval calculations on the thickness or strength class and drawings showing pipe lengths, joints, and other construction and installation details. All pipe furnished shall be fabricated only in accordance with the drawings and these specifications.

1.4 QUALITY ASSURANCE

A. Performance Tests: The Contractor shall test all gravity sewers constructed. The Contractor shall constantly check horizontal and vertical alignment. Testing for vertical deflection in the case of non-rigid pipe and sewer watertightness testing in the case of all gravity sewers and hydrostatic testing of ductile iron pipe shall be as specified in this Section.

B. Line and Grade Requirements: The Contractor shall provide assurance to the Westfield Public Works Department's representative that the sewer is laid accurately to the required line and grade as shown on the drawings. The Contractor shall utilize a laser beam instrument to lay and check the alignment and grade between manholes. Before proceeding with the next section of sewer, the last section shall be checked for proper line and grade. Variations from a uniform line and grade as shown on the drawings and described below shall be cause for the line to be rejected.

1. Variance from established line and grade shall not be greater than 1/32 of an inch per inch of pipe diameter and not to exceed 1/2 inch, provided that such variation does not result in a level or reverse sloping invert; provided also that the variation in the invert elevation between adjoining ends of pipe, due to non-concentricity of joining surface and pipe interior surfaces, does not exceed 1/64 inch per inch of pipe diameter or 1/2 inch maximum.

C. Test Sections

1. Initial Performance Test: An initial performance and leakage test will be performed on the first sections of sanitary sewer constructed of approximately 600 feet in length of each size and type sewer material installed. No additional sewer pipe shall be installed until the first section of sewer of each size and type of sewer material has satisfactorily passed the test for line and grade and the leakage test.
2. Subsequent Performance Testing: After the initial performance test and leakage test and as work progresses, the Westfield Public Works Department or designee may designate additional sections for testing as conditions in his opinion warrant. If a review of the Contractor's workmanship leads the Westfield Public Works Department or designee to question whether or not the tolerances and standards specified are being met, the Westfield Public Works Department or designee, reserves the right to select other locations and lengths to be tested. The Westfield Public Works Department or designee shall notify the Contractor of the location where a test is to be required not later than 15 days after the sewer installation has been completed. Unless otherwise authorized, the Contractor shall arrange to commence the test within 15 days after the sewer has been installed or 15 days after receiving notification by the Westfield Public Works Department, whichever date is later.
3. Final Performance Testing for Acceptance: Before acceptance for all new sanitary sewers, the Contractor and the Westfield Public Works Department or designee shall check all sewers, even if previously checked, for accurate alignment and grade. Also, all sanitary sewers shall be tested as specified in Articles 3.10 through

3.14 of this Section for watertightness. The program of testing whether by infiltration, exfiltration, air testing, or vacuum testing shall be determined by the Westfield Public Works Department.

1.5 LENGTH OF OPEN TRENCH

Except by permission of the Westfield Public Works Department not more than 450 feet of trench shall be opened at any one time. Not more than 30 feet of trench may be opened in advance of the completed pipe laying operation, and not more than one street crossing may be obstructed by the same trench at any one time.

1.6 RELATION TO WATER MAINS AND STORM SEWERS

A. All storm sewer crossings must be in accordance with the Town of Westfield's Stormwater Technical Standards Manual, Section 501.01. Should specific conditions prevent this separation, the Contractor shall notify the Westfield Public Works Department for specific instructions regarding the treatment of the separation.

B. All water main crossings must be in accordance with 327 IAC 3-6-9 and 327 IAC 8-3.2-9.

C. Sewers must be laid at least 10 feet horizontally from any existing or proposed water main. The distance is to be measured outside edge to outside edge. Should specific conditions prevent this separation, the Contractor shall notify the Westfield Public Works Department for specific instructions regarding the treatment of the separation. Special conditions may allow installation of the sewer closer to a water main provided that the water main is in a separate trench or on an undisturbed earth shelf located on one side of the sewer and at an elevation so the bottom of the water main is at least 18 inches above the top of the sewer. It will be necessary to install 150 psi water main pipe and joints as sewer pipe for the congested areas.

D. Whenever the sewer crosses a water main, it should be laid at least 18 inches below the main, or the water main should be relaid with fittings to cross over the sewer. The crossing shall be arranged so that the sewer joints will be equidistant and as far as possible from the water main joints. Any joints within a distance of 10 feet from either side of the crossing must be compression joints. All crossings must be at a minimum of 45 degrees from center lines of the sanitary sewer and the water main.

E. When it is impossible to obtain proper horizontal and vertical separation as stipulated above, the sewer shall be designed and constructed equal to water pipe, and shall be pressure tested to assure watertightness prior to

backfilling. Maximum distance between sewer pipe joints and water pipe shall be provided where vertical separation is a problem.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Sewers 15 Inches or Smaller

1. Sewers 15 inches in diameter or smaller shall be PVC composite pipe, polyvinyl chloride pipe or ductile iron pipe.
2. PVC Composite Sewer Pipe and Fittings: PVC composite sewer pipe and fittings shall conform to ASTM D2680, latest revision.
3. Polyvinyl Chloride Pipe and Fittings
   a. Polyvinyl chloride pipe and fittings shall conform to ASTM D3034 SDR 35, Type PSM, latest revision.
   b. Maximum diameter of PVC sewer pipe to be used is 15 inches.
4. Ductile Iron Pipe and Fittings: Ductile iron pipe and fittings shall conform to the requirements of ANSI/ASTM A746, Ductile Iron Gravity Sewer Pipe.
   a. Thickness class requirements of ductile iron pipe to be used in conveyance of sanitary sewage by gravity shall be minimum thickness of Class 350 unless otherwise noted for standard length pipe.
   b. Outside surfaces of the pipe and fittings shall be bituminous coated complying with ANSI/AWWA A21.51/C151 and ANSI/AWWA A2110/C110.
   c. Inside surfaces of all pipe, fittings and adapters shall be lined with cement mortar and a bituminous seal coat. Cement mortar lining and bituminous seal coat shall meet the requirements of ANSI/AWWA A21.4/C104.
   d. Ductile iron pipe and fittings shall be push-on type conforming to ANSI A21.11 (AWWA C111), latest revision. Fittings shall be ductile iron and shall comply with ANSI Specification A21.10, latest revision, with mechanical joints for 150 psi working pressure.
5. Joints for PVC Sewer Pipe
   a. Joints on PVC sewer pipe shall be the integral bell type gasketed joint designed so that when assembled the elastomeric gasket inside the bell is compressed radially on

the pipe spigot to form a positive seal. The joint shall be so designed to avoid displacement of the gasket when installed in accordance with manufacturer's recommendations. The joint shall comply with the physical requirements of ASTM D3212, and the gasket shall be the only element depended upon to make the joint flexible and watertight.

b. All PVC Pipe entering a manhole shall have a manhole waterstop gasket as supplied by the manufacturer firmly clamped around the pipe at the manhole. If flexible entry type manhole system is used, the waterstop gasket is not required.

B. Sewers Greater than 15 inches

1. Ductile Iron Pipe and Fittings: Ductile iron pipe and fittings shall conform to the requirements of ANSI/ASTM A746, Ductile Iron Gravity Sewer Pipe.
   a. Thickness class requirements of ductile iron pipe to be used in conveyance of sanitary sewage by gravity shall be minimum thickness of Class 350 unless otherwise noted for standard length pipe.
   b. Outside surfaces of the pipe and fittings shall be bituminous coated complying with ANSI/AWWA A21.51/C151 and ANSI/AWWA A2110/C110.
   c. Inside surfaces of all pipe, fittings and adapters shall be lined with cement mortar and a bituminous seal coat. Cement mortar lining and bituminous seal coat shall meet the requirements of ANSI/AWWA A21.4/C104.
   d. Ductile iron pipe and fittings shall be push-on type conforming to ANSI A21.11 (AWWA C111), latest revision. Fittings shall be ductile iron and shall comply with ANSI Specification A21.10, latest revision, with mechanical joints for 150 psi working pressure.

C. Fittings

1. Fittings such as wyes and bends shall be made in such a manner as will provide strength and watertightness at least equal to the class of the adjacent main line pipe to which they are jointed and shall conform to all other requirements specified for pipe of corresponding class and internal diameter. Joints shall be of the same type as used on the adjoining pipe.
2. Fabricated branches for wyes and tees shall be securely attached to the wall of the pipe in a watertight manner and shall be flush with

the inside surface of the pipe. The branches shall have their axes perpendicular to the longitudinal axis of the pipe. Wye branches shall have their axes approximately 60 degrees for clay pipe and 45 degrees for concrete pipe from the longitudinal axis of the pipe, measured from the bell end. Pipe reinforcement shall not be interrupted beyond a radial distance of 3 inches outside of the fitting.

D. Manholes and Other Structures: Manholes shall be constructed of monolithic concrete or precast manhole sections. Precast manhole sections shall conform to requirements of ASTM Specification C478 latest revision.

1. Materials for manholes, junction chambers, diversion chambers, and miscellaneous concrete structures shall comply with the following:
   a. Concrete for precast manhole sections shall be 3000 psi concrete. Monolithic manholes shall use 4000 psi concrete. Ready-mix concrete shall conform to ASTM C94 Alternate 2. Maximum size of aggregate shall be 1-1/2 inches. Slump shall be between 2 and 4 inches.
   b. Forms for chamber and structures shall be plywood or other approved material. Steel forms shall be used for the inside face of monolithic concrete manholes.
   c. Reinforcing steel shall conform to ASTM A615, Grade 40 deformed bars, or ASTM A616, Grade 40 deformed bars.
   d. Mortar Materials
      (1) Sand - ASTM Designation C144, passing a No. 8 sieve.
      (2) Cement - ASTM Designation C150, Type 1.
      (3) Water - shall be potable.
   e. All joints shall be fully sealed and waterproofed. Rubber gaskets for precast concrete manhole sections shall meet the requirements of ASTM C443. The gasket shall be the sole element depended upon to make the joint flexible and watertight.
   f. The manufacturer of the precast manholes shall provide core-drilled openings to produce a smooth, uniform, cylindrical hole of the proper size to accommodate a resilient connector meeting the requirements of ASTM C 923 for all sewers entering and leaving the manhole. The resilient connectors shall be either Press-Seal Gasket Corp., which provides PSX gasket or Press Wedge II; or similar

flexible manhole sleeves furnished by Kor-N-Seal by NPG Systems, Inc.; or equal.
   g. Precast manhole sections shall be steam cured and shall not be shipped from the point of manufacture for at least five days after having been cast. The exterior surface of each section shall be thoroughly coated with a coal tar epoxy type coating as manufactured by TNEMEC Co. Tneme-46H413 Hi-Build Tneme-Tar; or approved equal by the Engineer. Final dry mils thickness shall be a minimum of 12 mils. Monolithic concrete manholes and other concrete structures shall be cured for a minimum of seven days and then coated in the field with a coal tar epoxy type coating as mentioned above.
   h. Manhole castings shall be of good quality cast iron and/or ductile iron, conforming to ASTM Designation A48. Castings shall have a total weight of not less than 335 pounds and shall conform to the design of the manhole casting as shown on the standard detail sheet. Castings shall have three bolt holes equally spaced around base of frame and shall be securely anchored to cone section to provide a water tight-fit with three 3/8-inch stainless steel bolts and expansion shields. Unless specifically designated otherwise, manhole castings shall be the non-locking type.
   i. Manhole steps shall be made from a steel reinforcing rod encapsulated in a copolymer polypropylene resin. The manhole steps shall equal or exceed OSHA requirements. Manhole steps manufactured by M. A. Industries, Inc., PS-I-PF, Clay & Bailey Mfg. Co., or equal, are acceptable.
   j. Any other special manholes, junction chambers, diversion chambers, and miscellaneous concrete structures shall be constructed as detailed on the drawings.
   k. The Contractor may, at his option, furnish and install a combination precast concrete base and first section with precut openings for services. Detailed drawings shall be submitted to the Westfield Public Works Department prior to manufacture.
   l. Precast manhole sections shall have a lifting eye cast into the wall for lifting the section. Lifting holes through the precast section will not be allowed.

E. Grease Trap: Grease trap tank shall be constructed of 6000 psi concrete. All tank joints shall be sealed watertight with butyl rubber extrudible preformed gasket material. All outside riser ring surfaces shall be waterproofed 1/8" with trowelable grade butyl rubber back plaster.

PART 3 - EXECUTION

3.1 INSPECTION AND REJECTION OF PIPE

A. The quality of all materials, the process of manufacture, and the finished pipe shall be subject to inspection and approval by the Westfield Public Works Department. Such inspection may be made at the place of manufacture or on the work after delivery, or at both places; and the pipe shall be subject to rejection at any time on account of failure to meet any of the specifications' requirements even though sample pipes may have been accepted as satisfactory at the place of manufacture.

B. Prior to being lowered into the trench, each pipe shall be carefully inspected, and those not meeting the specifications shall be rejected and at once removed from the work.

C. The Westfield Public Works Department or designee shall have the right to cut cores from such pieces of the concrete pipe as desired for such inspection and test as may apply. The cost to cut the cores and administer appropriate test shall be paid by the developer.

D. Holes left by the removal of cores shall be filled in an approved manner by and at the expense of the manufacturer of the pipe.

E. The Westfield Public Works Department or designee shall also have the right to take samples of concrete after it has been mixed, or as it is being placed in the forms or molds, and to make such inspection and tests thereof as desired. The cost to administer appropriate test shall be paid by the developer.

F. Any pipe which has been damaged after delivery will be rejected and replaced solely at the Contractor's expense.

3.2 HANDLING PIPE

Each pipe section shall be handled into its position in the trench only in such manner and by such means as the Westfield Public Works Department or designee approves as satisfactory. As far as practicable, the Contractor will be required to furnish slings, straps, and other approved devices to permit satisfactory support of all parts of the pipe when it is lifted.

3.3 NOTICE TO WESTFIELD PUBLIC WORKS DEPARTMENT

The Westfield Public Works Department or designee shall be notified when the pipes are to be laid in the trench. At least 15 feet of the pipe shall, under ordinary circumstances, be laid before covering begins.

3.4 LAYING PIPE

A. All pipe shall be reinspected for soundness and damage due to handling immediately before being lowered into the trench. Any pipe found to be unsound or damaged will be rejected and shall be removed immediately from the site of the work.

B. All pipe shall be laid accurately to the required line and grade as shown on the drawings, and in the manner prescribed by the pipe manufacturer and appropriate ASTM Specifications, to form a close, concentric joint with the adjoining pipe and to bring the invert of each section to the required grade. The supporting of pipe on block will not be permitted.

C. Pipe laying shall proceed upgrade, beginning at the lower end of the sewer.

D. All sewers shall be designed and constructed to give mean velocities when flowing full, of not less than 2.0 feet per second (0.6 m/s), based on Manning's formula using an "n" value of 0.013. The following are the recommended minimum slopes which should be provided; however, slopes greater than these are desirable. Refer to 327 IAC 3-6-12 for anchoring requirements for extremely steep slopes.

Nominal Sewer Size		Minimum Slope in Feet Per 100 Feet (m/100m)
8 inch	(200 mm)	0.40
10 inch	(250 mm)	0.28
12 inch	(300 mm)	0.22
14 inch	(350 mm)	0.17
15 inch	(375 mm)	0.15
16 inch	(400 mm)	0.14
18 inch	(450 mm)	0.12
21 inch	(525 mm)	0.10
24 inch	(600 mm)	0.08
27 inch	(675 mm)	0.067
30 inch	(750 mm)	0.058
33 inch	(825 mm)	0.052
36 inch	(900 mm)	0.046
39 inch	(975 mm)	0.041
42 inch	(1050 mm)	0.037

E. Watertight work in conformance with 327 IAC 3 is required, and the Contractor shall construct the sewers with the type of joint specified therein.

F. All pipe shall be laid to the line and grade as shown on the drawings. Variations from a uniform line and grade as shown on the drawings shall be cause for the line to be rejected.

G. The ends of the pipe shall be satisfactorily cleaned just before laying, and the joint shall be made in a satisfactory manner in accordance with the recommendations of the manufacturer on particular type of joint. All joint work shall be done by experienced workmen.

H. PVC (polyvinyl chloride) gravity sewer pipe and fittings, ASTM Designation D3034 SDR 35, shall be installed in accordance with the directions contained in ASTM Designation D2321. Only materials classified as Class I will be acceptable for bedding, haunching, and initial backfill of the pipe placed and compacted in accordance with ASTM D2321.

I. Joints on PVC pipe shall be the integral bell type gasketed joint designed so that when assembled the elastomeric gasket inside the bell is compressed radially on the pipe spigot to form a positive seal. The joint shall be so designed to avoid displacement of the gasket when installed in accordance with the manufacturer's recommendations. The gasket shall be the only element depended upon to make the joint flexible and watertight.

J. All PVC pipe entering a manhole shall have manhole waterstop gasket as supplied by the manufacturer firmly clamped around the pipe. If flexible entry type manhole system is used, the waterstop gasket is not required.

K. All PVC pipe shall have a deflection test performed by the Contractor in the presence of the Westfield Public Works Department or designee.

L. All pipe shall be bedded as described in this specification under Pipe Bedding. Bell holes shall be excavated in advance of pipe laying so the entire pipe barrel will bear uniformly on the prepared subgrade.

M. Each length of pipe shall be mechanically pulled "home" with a winch or come-along against the section previously laid and held in place until the trench and bedding are prepared for the next pipe section. Care shall be taken in laying the pipe so not to damage the bell end of the pipe. Mechanical means consisting of a cable placed inside the pipe with a winch, jack, or come-along shall be considered to pull the pipe home where pushing the pipe will not result in a joint going completely home and staying in place. Pushing the pipe home shall be done by means of a block and push bar. Use of hydraulic excavating equipment as the means of pushing or moving the pipe to grade will not be permitted.

N. The Contractor shall use laser beam equipment to maintain accurate alignment and grade. A qualified operator shall handle the equipment during the course of construction. If bending of the laser beam due to air temperature variations or dust in the air is apparent "within the pipe" units, a fan shall be provided to circulate the air. However, air velocity shall not be so excessive as to cause pulsating or vibrating of the beam. Survey instruments may be used for checking alignment and grade if questions arise about the accuracy of the work.

O. Open excavation shall be satisfactorily protected at all times. At the end of each day's work, the open ends of all pipes shall be protected against the entrance of animals, earth, or debris by bulkheads or stoppers. The bulkheads or stoppers shall be perforated to allow passage of water into the installed pipe line to prevent flotation of the pipe line. Any earth or other material that may find entrance into the main sewer or into any lateral sewer through any such open end of unplugged branch must be removed at the Contractor's expense.

P. The Contractor shall conduct a leakage test as described in Sewer Tests of the specification on the first section of sewer of each size and type sewer material installed. No additional sewer pipe shall be installed until the first reach of sewer of each size and each type sewer material has satisfactorily passed the leakage test.

Q. The Contractor shall prevent all ground water and surface water from entering the existing sewer system during construction of a new sewer or force main extension.

R. Sanitary sewer designs that require crossing a county legal drain shall be approved and constructed per the latest standards of the Hamilton County Surveyor's Office.

3.5 PIPE BEDDING AND HAUNCHING

A. Each pipe section shall be laid in a firm foundation of bedding material and haunched and backfilled with care.

B. Prior to pipe installation, carefully bring bedding material to grade along the entire length of pipe to be installed. To provide adequate support for the pipe, the following bedding procedures are recommended.

1. When Class I material is used for bedding, little or no compaction is necessary due to the nature of the angular particles. A depth of 4 to 6 inches is generally sufficient to provide uniform bedding.

C. Bedding material shall have a minimum thickness beneath the pipe of 4 inches (100 mm) or one-eighth of the outside diameter of the pipe, whichever is greater, and shall extend up the sides of the pipe one-sixth of the outside diameter of the pipe.

D. For rigid pipe, such as concrete or ductile iron, backfill between the bedding material and a plane 12 inches (300 mm) over the top of the pipe shall be hand-placed finely divided earth, free from debris and stones, or granular backfill if required.

E. For flexible pipe such as PVC, the placement of embedment material consisting of bedding, haunching, and initial backfill, must be done with care. The ability of the pipe to withstand loading in a trench depends a large part on the method employed in its installation. Class I material, as defined in specification Section 02222, Article 2.1, paragraph A, shall be used as embedment material for flexible pipe. Bedding thickness shall be as specified in paragraph C of this Section. The haunching material (the material from the bedding to the pipe springline) and initial backfill (the material from the pipe springline to a plane 12-inches over the top of pipe), shall be hand placed. Care must be taken to not cause damage by compacting the material directly over the pipe.

F. In yielding subsoils, the trench bottom shall be undercut to the depth necessary and backfilled with graded, crushed stone to form a firm foundation.

G. Where excavation occurs in rock, or hard shale, the trench bottom shall be undercut and a minimum of 6 inches (150 mm) crushed stone bedding placed prior to pipe installation. Additional payment for rock, excavation shall be made on "unit cost" projects only, and as prescribed under basis for payment.

3.6 MANHOLES AND OTHER STRUCTURES

A. Manholes shall meet all requirements of 327 IAC 3-6-10.

B. Manholes and other structures are to be constructed at locations shown on the drawings and in accordance with the following specifications.

1. Precast concrete manhole sections shall conform to ASTM Designation C478, except as modified herein.
   a. The joint design of the precast sections shall consist of a bell or groove on one end of the unit of pipe and a spigot or tongue on the adjacent end of the joining section.

   b. The joint shall consist of a round rubber gasket confined in a groove in the spigot end of the precast manhole section and shall conform to Sections 6.1.6, 6.1.7 and 9 of ASTM Designation C443, latest revision and a 6 inch wide flexible butyl rubber joint sealant between the outside joints. Inside manhole joints are to be sealed with hydroplug or non-shrink grout and brushed smooth.
2. Openings in manhole sections for sewer connections shall be core-drilled at the point of manufacture and shall be done to produce a smooth, uniform, cylindrical hole of proper size to accommodate a resilient connector meeting requirements of ASTM C 923. The resilient connectors shall be either Press-Seal Gasket Corp., PSX Gasket or Press-Wedge II; or similar flexible manhole sleeves furnished by Kor-N-Seal by NPC Systems, Inc.; or equal.
3. Manhole bases shall be cast-in-place concrete, reinforced as shown on the Standard Detail Sheet, or monolithic base and first section combination. Manhole bases shall be cast or placed on a minimum of 6 inches of compacted crushed stone.
4. Manhole channels or inverts shall be preformed and poured with Class "B" concrete to the spring line of the connecting pipe. The finished invert shall be a semi-circular shaped smooth channel directing the flow to the downstream sewer.
5. Monolithic concrete manholes, junction chambers, and other cast-in-place concrete structures shall be cured for a minimum of seven days. The exterior surfaces shall then be coated thoroughly with a coal tar epoxy type coating as manufactured by TNEMEC Co., Tneme-46H413 Hi-Build Tneme-Tar; or approved equal by the Westfield Public Works Department. Coating shall be 12 mil minimum dry film thickness. Each joint of precast concrete manhole sections, lifting holes, and holes left by the removal of cores shall be fully mortared and shall be coated with a 12 mil minimum dry film thickness of coal tar epoxy as specified upon reaching its final set.
6. Any additional holes cut in the field shall be drilled with a core-drill or in a manner approved by the Westfield Public Works Department or designee.
7. Manhole frames and lids shall weigh not less than 335 pounds and be of good quality cast iron, conforming to ADTM Designation A48. Unless specifically designated otherwise, manhole castings shall be the non-locking type. All manhole frames shall be cast or drilled with be cast or drilled with three holes equally spaced around base of frame and shall be securely anchored to cone section with three 3/8-inch stainless steel bolts, nuts, and washers. The joint between the casting frame and cone section shall be first sealed with cement mortar and then coated with a pliable butyl

rubber or a coal tar epoxy coating upon reaching its final set to become a watertight joint.
8. Manhole steps shall be made from a steel reinforcing rod encapsulated in a copolymer polypropylene resin. Steps shall be placed as shown on the approved drawings.

3.7 HOUSE/BUILDING SERVICES

A. The Contractor shall install 6-inch diameter house/building service sewer shall be installed as shown on the Standard Detail Sheet. The house/building service shall extend from a "wye" or "tee" fitting in the main sewer line to the property line or easement line, unless stated otherwise.

B. A backwater prevention valve shall be provided for each sanitary sewer lateral. The backwater prevention valve shall be located on the inside of basements or crawl spaces and readily accessible at all times. The backwater prevention valve for buildings located on slabs shall be installed on the building side of the clean out.

C. The Contractor shall contact the individual property owners for the preferred location of the house/building service to best suit the property owner's needs. If the Contractor is unable to contact the property owner in advance of laying the main sewer by or across the property, the Contractor shall so notify the Westfield Public Works Department or designee in writing.

D. Fittings for house/building service connections on a main line sewer 15 inches in diameter or smaller shall be tees or 45-degree wyes and shall be of the same material as the main line sewer, unless otherwise approved by the Westfield Public Works Department.

E. House/building services and connections on main line sewers greater than 15 inches in diameter shall be of a type that will maintain the structural integrity of the main line sewer and provide a watertight connection. Intrusion of house/building services into the flow way of the main line sewer should not be permitted.

F. Six-inch lateral pipe shall connect to the main line sewer at an angle of 15 degrees to 45 degrees from the spring line and shall include the necessary bends and straight pipe sections to reach the property line at the elevations specified. A pipe stopper or a bell cap shall be placed on/in the last bell. This stopper or bell cap should be compatible with the type of infiltration/exfiltration test performed on the sewer.

CITY OF WESTFIELD SPECIFICATIONS
WESTFIELD HIGH SCHOOL ADDITION
WESTFIELD WASHINGTON SCHOOLS
322 WEST MAIN STREET
WESTFIELD, IN 46074

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REGISTERED PE 10000126 STATE OF INDIANA PROFESSIONAL ENGINEER

Date 02-06-09

Sheet C902

Date 02-06-09

Project Number 040338-20201

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G. The Contractor shall furnish and use the proper fittings, couplings, and adapters suited to make the transition between different pipe materials which will maintain the structural integrity and the watertightness of the entire sewer system.

H. At the discretion of the Westfield Public Works Department, when and where improper installation practices are suspected or questionable bedding materials and methods are employed, or where the installations are severe, the Contractor will have to perform deflection testing on the 6-inch house laterals as specified in Article 3.9

I. Backfill around fittings and lateral pipe shall be carefully placed and compacted to prevent damage from backfill settlement and shall be installed in same manner as described for sewer installation

J. The Contractor shall keep accurate horizontal and vertical location measurements of each house/building service installed. The location of all house/building services shall be shown on digital as-builts as described in Section 01001, Article 1.14. The accuracy of the measurements shall be the Contractor's responsibility

3.8 STUBS, CONNECTIONS, BULKHEADS, AND MISCELLANEOUS ITEMS OF WORK

A. Where special junction chambers are to be constructed or where existing sewers carrying sanitary sewage are encountered, the Contractor shall provide and maintain temporary connections to prevent a nuisance

B. Where called for shop connections and stubs for future sewer connections shall be provided

C. New sewer connections to existing manholes shall be neatly made by cutting a hole in the existing structure, concreting the sewer in place, and providing a watertight connection

D. The Contractor shall not connect any existing sewers or house/building services prior to the completion of the exfiltration/infiltration tests, air tests, and acceptance of the sewer without the permission of the Westfield Public Works Department.

3.9 VERTICAL DEFLECTION TESTING

For PVC pipe, the entire length of installed mainline pipe shall be tested for acceptance with an approved go-no-go mandrel under the observation of the design engineer and a Westfield Public Works representative. The testing shall be conducted after the final backfill has been in place for at least 30 days. No

pipe shall exceed a deflection of 5%. The deflection test shall be run using a mandrel having a diameter equal to 95% of the inside diameter of the pipe in accordance with ASTM D-3034 Appendixes. The pipe shall be measured in compliance with ASTM D-2122. All pipe exceeding the allowable deflection shall be replaced, repaired, and retested

3.10 INFILTRATION LIMITS

A. Maximum infiltration/exfiltration limits for all new sanitary sewers shall not exceed 200 gallons per inch of diameter per mile of pipe per 24 hours for any section of the system. All sections of the sewer shall be tested, and any sections not meeting this infiltration standard shall be repaired and retested

B. The Contractor shall note the special provision under Article 3.4, Paragraph P, that the first section of sewer of each size and type of sewer shall be given a satisfactory leakage test before proceeding with any additional construction.

3.11 SEWER WATERTIGHTNESS TESTING

A. Infiltration testing must be performed in accordance with 327 IAC 3-6-19.d. Tests for watertightness shall be conducted on all installed sewers in the presence of and in the manner accepted by the Westfield Public Works Department or designee. The Contractor shall furnish and install all equipment necessary for the sewer tests

B. Watertightness tests shall be conducted on short sections of the sewer as soon as the manholes have been constructed and the backfilling completed

C. Where the section tested is in excess of the allowable limits, the Contractor shall correct the construction of the sewer so that the section tested is within the allowable limit. All methods and materials used in the repair shall be approved by the Westfield Public Works Department or designee

D. The program of testing shall fit the conditions as determined by the Westfield Public Works Department or designee using Air Test for Leakage. When ductile iron pipe with push-on type joints are used for sewer construction, a hydrostatic pressure test shall be performed.

A few key manholes shall have a one-half inch diameter threaded pipe nipple installed through the manhole wall directly on top of one of the sanitary sewers entering the manhole. Every manhole need not have a pipe nipple installed. The design engineer shall designate the manholes to

be used for gauging the ground water level. The pipe nipples shall be sealed with a treaded one-half inch cap.

Immediately before air testing, the ground water level shall be determined by removing the treaded caps(s) from the nipple(s) nearest the section to be tested, blowing air through the pipe nipple(s) to remove any obstructions, and then connecting clear plastic tube(s) to the pipe nipple(s). Each plastic shall be held vertically to allow groundwater to rise in it. After the water level in the tube has stopped rising, a measurement of the height in feet of water over the invert of the sewer pipe shall be taken. If the section to be tested is not immediately adjacent to an installed pipe nipple, the groundwater height shall be estimated based upon nearby height readings and the pipe's invert elevation.

Alternate groundwater monitoring methods shall require the prior written approval of the WPWD Director

1. The Air Test for Leakage

   a. The air test for leakage shall be used to test sewer watertightness on all sewer pipe unless otherwise noted.
   b. The ends of the sewer section being tested shall be sealed and properly blocked. The seal at one end shall have an orifice through which to pass air into the pipe. An air supply shall be connected to the orifice at one end of the section. The air supply line will contain an off-on gas valve and a pressure gauge having a range from 0 to 25 psi. The gauge shall have minimum divisions of 0.10 psi and shall have an accuracy of the nearest ±0.1 psi. The seals at each manhole shall be properly blocked to prevent displacement while the line is under pressure.

2. Procedure for Conducting a Low Pressure Air Test

   a. Clean pipe to be tested by propelling a snug fitting inflated ball through the pipe by water pressure or other adequate method. This step is important because it not only flushes out construction debris but the water used to flush the pipe dampens the pipe wall. The rate of air loss through pipe wall permeation can be significant on dry pipes.
   b. Plug all pipe outlets with pneumatic plugs having a sealing length equal to or greater than the diameter of the pipe to be tested. The pneumatic plug shall be able to resist internal testing pressures without requiring external bracing.

   c. The groundwater level surrounding the section of sewer under testing shall be determined by one of the procedures previously outlined in paragraph D. If the groundwater table is above the pipe, then test pressures shall be increased by the corresponding increment (e.g., if the groundwater table is above the lowest crown of the pipe, the air pressure should be increased 0.433 times each foot of water.)
   d. Once the pipe outlet plugs are securely in place, pressurized air is introduced to the system. The air shall be fed through a single control panel with three individual hose connections as follows
      (1) from control panel to pneumatic plugs for inflation in sewer pipe.
      (2) from control panel to sealed line for introducing the pressurized air.
      (3) from sealed line to control panel. This line will enable continuous monitoring of the air pressure rise in the sealed line
   e. The air shall be introduced slowly to the section of pipe under evaluation until the internal air pressure is raised to 4.0 psig greater than the hydrostatic pressure head created by the existence of groundwater that is over the pipe section.
   f. A minimum of two minutes shall be provided for the air pressure to stabilize to conditions within the pipe. (This stabilization period is necessary for variations in temperature to adjust to the interior pipe conditions.) Air may be added slowly to maintain a pressure from 3.5 to 4.0 psig for at least two minutes
   g. After the stabilization period, when the pressure reaches exactly 3.5 psig, the stopwatch shall be started; and when the pressure reaches 2.5 psig, it is stopped. The portion of the line being tested shall be acceptable if the time in minutes for the air pressure to decrease from 3.5 psig to 2.5 psig is greater than the time shown in the following table

Pipe Diameter (Inches)	Time (Minutes)
4	2.0
6	3.0
8	4.0
10	5.0
12	5.5
15	7.5
18	8.5
21	10.0
24	11.5

   h. In areas where the groundwater is above the top of the pipe, the test pressures shall be increased by 0.433 per foot of groundwater (e.g., if the groundwater is 11-1/2 feet, the 3.5 to 2.5 pressure drop will be increased by 5 psi; the time then will be measured for a pressure drop from 8.5 psi to 7.5 psi.)

3. Safety Precautions During Air Test

   a. The air test may be dangerous if, because of ignorance or carelessness, a line is improperly prepared. It is extremely important that the various plugs be installed and braced in such a way as to prevent blowouts. Inasmuch as a force of 250 pounds is exerted on an 8-inch plug by an internal pipe pressure of 5 psi, it should be realized that sudden expulsion of a poorly installed plug or of a plug that is partially deflated before the pipe pressure is released can be dangerous.
   b. As a safety precaution, pressurizing equipment should include a regulator set at perhaps 10 psi to avoid over-pressurizing and damaging an otherwise acceptable line. No one shall be allowed in the manholes during testing

3.12 HYDROSTATIC TESTING

A. A hydrostatic test on ductile iron pipe with push-on type joints has two purposes: one is to set the gaskets in place, and the other is to provide a leakage test.

B. Said test shall include all ductile iron sewer pipe with push-on type joints installed by the Contractor. The Contractor shall make arrangements with the Westfield Public Works Department or designee for scheduling the test after the sewer pipe has been accepted as being ready for testing. The test shall be performed in the presence of the Westfield Public Works Department or designee on the day mutually agreed upon.

C. Water for testing may be obtained from the Westfield Public Works Department or designee. The cost of the water supplied for such testing is to be paid by the Developer. The Contractor shall furnish all necessary

equipment, piping, pumps, fittings, gauges, and operating personnel to properly conduct the test.

D. Hydrostatic test on ductile iron pipe with push-on type joints installed as gravity sewers and siphons shall be in accordance with the following provisions:

1. The ends of the sewer section being tested shall have test plugs or caps adapted with a tap of adequate diameter to fill and pressurize the system with water.
2. When a section is terminated at a manhole with a plain end (spigot), the pipe must extend into the manhole of sufficient length to accommodate a restraining cap. The benchwall shall be formed in the manhole after the test section has been approved.
3. Water shall be introduced into the section to be tested at the lower end. The upper end shall have an orifice at the top of the plug or cap to expel air when filling the system with water. All air shall be expelled from the pipe.
4. The test plugs or caps shall be capable of withstanding an internal pressure of 175 psi.
5. The system shall be tested in conformance with Section 13 of AWWA Specifications 600, at 50 pounds per square inch over a period of not less than one hour. The system will not be acceptable until all leaks have been repaired
6. Hydrostatic test may be dangerous if, because of ignorance or carelessness, a line is improperly prepared. It is extremely important that the various plugs be installed in such a way as to prevent blowouts. Inasmuch as a force of 2500 pounds is exerted on an 8-inch plug by an internal pipe pressure of 50 psi, it should be realized that sudden expulsion of a poorly installed plug or cap can be dangerous. As a safety precaution, no one shall be allowed in the manholes when the pipe is pressurized.

E. A hydrostatic test on ductile iron pipe with push-on type joints installed as force main shall be in accordance with Article 3.12, paragraph D., with the following exception:

1. The force main shall be subjected to an internal pressure equal to 50% more than the maximum operating pressure, but in no case less than 50 psig or greater than 120 psig

3.13 MANHOLE VACUUM TESTING

A. A vacuum test shall be conducted by the Contractor on all manholes to ensure watertightness and manhole integrity.

B. The equipment required to conduct a vacuum test on manholes includes inflatable pipe plugs, test head, vacuum pump, flexible air hose, and a vacuum gage. The test equipment shall be capable of drawing a vacuum of 10-inch Hg. The equipment shall be designed specifically for the purpose of testing manholes and shall be as manufactured by P.A. Glazier, Inc., Worchester, Massachusetts 10002, or equal.

C. The procedure for conducting an air test on manholes shall be in accordance with these specifications and ASTM C1244-05a

1. Each manhole shall be tested immediately after assembly and prior to setting the casting or backfilling around the structure
2. All lift holes shall be plugged with non-shrink grout
3. All pipes entering the manhole shall be securely plugged and adequately braced against the inside of the manhole to prevent being drawn out of the pipe
4. The test head shall be placed on the inside of the cone section and sealed with an inflatable seal or per manufacturer's recommendation
5. A vacuum of 10 inches of mercury (Hg) shall be drawn, the vacuum line closed, and the vacuum pump shut off. With the valves closed, the time shall be measured for the vacuum to drop to 9 inches. The manhole shall pass if the time is greater than the following

Minimum Test Times for Various Manhole Diameters in Seconds
ASTM C 1244-05a

Depth, ft.	Diameter, in								
	48	54	60	66	72	78	84	90	96
<4	10	12	13	15	16	18	19	21	23
6	15	18	20	22	25	26	29	31	34
8	20	23	26	29	33	35	38	41	45
10	25	29	33	36	41	44	48	52	56
12	30	35	39	43	49	53	57	62	67
14	35	41	46	51	57	62	67	72	78
16	40	46	52	58	67	70	76	83	89
18	45	53	59	65	73	79	86	93	100
20	50	53	65	72	81	88	95	103	111
22	55	64	72	79	89	97	105	114	122
24	59	64	78	87	97	106	114	124	133
26	64	75	85	94	105	114	124	134	144
28	69	81	91	101	113	123	133	145	155
30	74	87	98	108	121	132	143	155	166

3.14 CLOSED CIRCUIT TELEVISION INSPECTION

A. All sections of sewers shall be inspected by closed circuit television

B. All unacceptable conditions found during television inspection must be corrected by the Contractor and re-televised

C. Unacceptable conditions are conditions that adversely affect the ability of the system to function as designed or to be properly maintained and may include, but are not limited to, the following

1. Protruding taps
2. Cracked or faulty pipe
3. Misaligned or deformed pipe
4. Debris in line
5. Infiltration / exfiltration
6. Excessive gaps at joints
7. Bellies or sags with a depth greater than or equal to 10% (or a maximum of 1-1/2 inches) of pipe diameter and/or a length greater than 25 feet

D. See Specification Section 02750 Sewer Televising for procedures

3.15 DIGITAL AS-BUILTS/RECORD DRAWINGS

A. The Developer shall prepare or be responsible for the preparation and submittal of digital as-builts as described in Section 01001, Article 1.14

SECTION 02750 - SEWER TELEVISING

PART 1 - GENERAL

1.1 GENERAL

A. This section covers all work necessary for the cleaning and televising of sanitary and storm sewers to determine the water tightness, connections, alignment, grades and locations of service.

B. The type equipment required for the work and the methods of accomplishing the work, as well as the type of materials to be incorporated into the work, are covered in this Section.

C. The Contractor shall introduce enough water into sewer pipe to indicate bellies or sags in line being televised

PART 2 - PRODUCTS

2.1 EQUIPMENT REQUIRED

A. The Contractor shall furnish all labor, electronic equipment, and technicians to perform the closed circuit television inspection of the sewers. Operation of the equipment is to be controlled from above ground with a skilled technician at the control panel in the television studio, controlling the movement of the television camera through the sewer in either direction.

B. The color television camera shall be one specifically designed and constructed for the purpose of televising sewers. The color camera shall have a high resolution lens capable of spanning 360 degrees circumference and 270 degrees on horizontal axis to televise sewer lines 8 inches in diameter and larger. Focal distance shall be adjustable through a range of 1 inch to infinity. The purpose of the rotating head camera is to view all service connections and to locate all defects, as well as any questionable problem areas. The camera shall be mounted to a self-propelled crawler/transporter.

C. Camera lighting quality shall be suitable to provide a clear, continuously in focus picture of the entire inside periphery of the sewer pipe for all conditions encountered during the work. The camera shall be able to operate efficiently in 100% humidity conditions. The camera, television monitor, and all other necessary components of the video system shall be capable of producing a minimum 350-line resolution color video picture.

D. The view seen by the television camera shall be transmitted to a VCR and a color monitor of not less than 17 inches. The TV camera shall have the capability of transmitting a color picture with not less than 600 lines of resolution, the monitor and VCR shall have the capability of receiving same. The monitor and VCR shall be located inside a mobile TV studio

E. Contractor shall supply digital video to client on 700 mb compact disks in the following format:

1. Minimum 640 x 480 pixel dimension
2. Minimum 24 fps (frames per second)
3. Indexed chapters to allow instant access to points of observation
4. Cross-platform compatible to allow for viewing on any operating system

F. The Contractor's mobile studio shall be large enough to accommodate up to three people for the purpose of viewing the monitor while the inspection is in progress. The Westfield Public Works Department or designee shall have access to view the television screen at all times

G. The Contractor will provide two clear copies of the video/television inspection to the Westfield Public Works Department with complete log sheets.

H. The technician will provide audio input at the time of inspection pointing out cracks, root intrusion, broken tile, infiltration and any other items pertinent to the evaluation of the sewer line.

I. After completion of each section of the sewer inspection, the Contractor shall furnish to the Westfield Public Works Department a computerized report. This report will be generated by an onboard computer and printer and will provide commentary on fault areas. The report will also describe all other pertinent findings regarding service connections, breaks or cracks in pipes, bellies or sags, infiltration, and other items of interest.

PART 3 - EXECUTION

Not Used

END OF SECTION 02750

D. The view seen by the television camera shall be transmitted to a VCR and a color monitor of not less than 17 inches. The TV camera shall have the capability of transmitting a color picture with not less than 600 lines of resolution, the monitor and VCR shall have the capability of receiving same. The monitor and VCR shall be located inside a mobile TV studio

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PART 3 - EXECUTION

Not Used

END OF SECTION 02750

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CHAPTER 400 STORM SEWER PIPES AND OPEN CULVERT MATERIALS

SECTION 401 GENERAL

401.01 Introduction

This section covers all work necessary for the construction of the storm sewer piping systems and related items complete, including catch basins and inlet drains, manholes, junction chambers, diversion chambers, outfall structures, and miscellaneous structures

This specification covers the following types of materials for storm sewers, culverts, underdrains, inlet drains, conduits, and miscellaneous applications

1. Reinforced Concrete Pipe and Fittings
2. Polyvinyl Chloride Pipe (PVC)
3. Corrugated Metal Pipe
4. Structural Plate Arches
5. Aluminum or Aluminized Steel Pipe and Structural Plate
6. Multi-Plate Pipe and Pipe Arches
7. PVC Composite Pipe
8. Corrugated Polyethylene Pipe - SSD (Perforated and Non-Perforated)

All lots shall have access to a subsurface or storm drain or open ditch

Storm sewer systems shall have a minimum of four hundred (400) feet between structures

This specification requires project plans and construction specifications to be submitted to and approved by all appropriate regulatory agencies prior to beginning any work.

Before construction and preferably before fabrication, the Contractor shall submit to the Town of Westfield Public Works Department for approval calculations on the thickness or strength class and drawings showing pipe lengths, joints, and other construction and installation details

Pipe Marking
Each length of pipe shall bear the name or trademark of the manufacturer, the location of the plant, and the date of manufacture. Each length shall likewise be marked to designate the class or strength of the pipe. The marking shall be made on the exterior or interior of the pipe barrel near the bell or groove end and shall be plainly visible

401.02 Minimum Size for Storm Sewers

The minimum diameter of all storm sewers shall be 12 inches. When the minimum 12-inch diameter pipe will not limit the rate of release to the required amount, the rate of release for detention storage shall be controlled by an orifice plate or other device, subject to acceptance of the Town of Westfield Public Works Department

401.03 Materials

Manholes, Inlets, and Other Structures

Storm sewer manholes and inlets shall be constructed of precast reinforced concrete. Material and construction shall conform to the latest edition of the Indiana Department of Transportation (INDOT) "Standard Specifications", Sections 702 and 720

Materials for manholes, junction chambers, diversion chambers, and miscellaneous concrete structures shall comply with the following

1. Cement shall be Portland cement and shall meet the requirements of ASTM Specification C150, ACI 301, and ACI 318. Concrete for precast manhole sections shall be 3000 psi concrete. Monolithic manholes shall use 4000 psi concrete. Ready-mix concrete shall conform to ASTM C94, Alternate 2. Maximum size of aggregate shall be 3/4 inch. Slump shall be between 2 and 5 inches.
2. Forms for chamber and structures shall be plywood or other approved material. Steel forms shall be used for the inside face of monolithic concrete manholes
3. Reinforcing steel shall conform to ASTM A615, Grade 60 deformed bars, or ASTM A616 Grade 60 deformed bars
4. Mortar Materials
   a. Sand - ASTM Designation C144, passing a No. 8 sieve
   b. Cement - ASTM Designation C150, Type 1
   c. Water - shall be potable

The manufacturer shall provide openings for sewers entering and leaving the manhole. Any additional openings needed to be made in the field shall be made by drilling holes at least 1/2 inch in diameter with a maximum spacing of 3 inches

Manhole steps shall be made from a steel reinforcing rod encapsulated in a copolymer polypropylene resin. The manhole steps shall equal or exceed OSHA requirements

Any other special manholes, junction chambers, diversion chambers, and miscellaneous concrete structures shall be constructed as detailed on the drawings

Manhole bases shall be set on a minimum of six (6) inches of # 8 aggregate

Concrete ends sections shall have a minimum of a twenty-four (24) inch toe plate, either poured in place or precast, bolted to the end section per Standard Detail (ST-30). Corrugated end sections with toe plates shall require Westfield Public Works approval

Catch Basins

During construction, precautionary measures such as adequate screening of grates shall be maintained to deter earth and other materials from entering the drains

Catch Basins, for sediment control, locations to be determined by a Professional Engineer, and approved by the Town of Westfield Public Works Department. Catch basins shall be located within easily accessible dedicated easements or right of way of sufficient size to facilitate the required maintenance of these structures

Catch basins and curb inlet structures which are two (2) feet by two (2) feet in size shall not have a depth deeper than four (4) feet from the invert of the lowest pipe to the lowest part of the rim

elevation of the casting. All structures which do not meet this criteria shall be a manhole type which is forty-eight (48) inches in diameter

Castings

Cast iron or ductile iron frames and gratings for catch basins and drain inlets shall be as shown on the drawings. Bearing surfaces shall be clean and shall provide uniform contact. Castings shall be tough, close-grained gray iron, sound, smooth, clean, free from blisters, blow holes, shrinkage, cold shuts, and all defects and shall conform to ASTM A48 Class No. 30-B

During construction, precautionary measures such as adequate screening of grates shall be maintained to deter earth and other materials from entering the drains

The following castings types are required

1. Manholes – Neenah R 1772 A or equivalent
2. Beehive Inlets – Neenah R 4342 or equivalent
3. "Roll Curb" Inlets – Neenah 3501 – TR or TL or equivalent
4. "Chair Back" Curb Inlet – Neenah 3287 – 10V or equivalent
5. Other types shall require approval of the Westfield Public Works Department

Curb inlets castings which possess open backs or have grate bars parallel to traffic flow (are not "bicycle safe) will not be accepted by the Westfield Public Works Department

Storm sewer castings manhole covers, beehive inlets, curb inlets or other approved casting shall have the following phrases cast in recessed letters two (2) inches in height

1. "Storm Sewer"
2. "Drains to River" or "Drains To Waterway"
3. "Dump No Waste"
4. Other phrases shall require approval of the Westfield Public Works Department

All castings frames shall have a horizontal bearing surface around the entire perimeter of the frame in order to support the cover or grate

Bench Walls
Bench walls shall be shaped and formed for a clean transition with proper hydraulics to allow the smooth conveyance of flows through the structure. The bench wall shall form a defined channel, to a minimum height of the spring line of the pipe

Bench walls shall be formed using full depth Class "A" concrete. Solid concrete block, stone or sand shall not be permitted as a base or filler for the construction of the bench wall

Reinforced Concrete Pipe and Fittings

Reinforced concrete pipe and fittings shall conform to ASTM C76, latest revision, for circular pipe and ASTM C507 for elliptical pipe

Reinforced concrete pipe and fittings for normal conditions shall be reinforced in accordance with ASTM C76, Class III, IV or V, Wall B (minimum). Acceptance shall be on the basis of Subsection 4.1.1 of ASTM C76

Circumferential reinforcing in circular pipe shall be required. Only with approval from the Westfield Public Works Department will elliptical reinforcing or combination of elliptical and circumferential reinforcing or part circular reinforcing shall be permitted, in circular pipe

Concrete pipe shall be steam cured and shall not be shipped from point of manufacture for at least five days after having been cast

Joints shall conform to the requirements of ASTM C443. Gaskets shall be of an oil resistant type having a maximum swell of 90% when tested in accordance with ASTM D471. Lubricant for jointing shall be approved by gasket manufacturer

All rubber gaskets similar to and equal to "Press-Seal" or "Tylox" conforming to ASTM Designation C443, latest revision. The gasket shall be attached to the spigot of the pipe and shall be the sole element depended upon to make the joint flexible and practically watertight.

Butyl mastic joint sealant in rope or trowel applied form specifically made for permanently sealing joints in tongue and groove concrete sewer pipe. The material shall adhere tightly to the pipe surface and form a tight, flexible joint. The material shall have been in use for at least five years. Test results and material specifications shall be submitted to the Westfield Public Works Department and shall have been approved prior to use on the project

Polyvinyl Chloride Pipe and Fittings

Polyvinyl chloride (PVC) pipe and fittings shall comply with ASTM D 3034

Corrugated Metal Pipe and Pipe Arches

The following specifications shall govern the manufacture of the corrugated steel pipe and pipe arches

1. Specifications for Zinc Coated (galvanized) Steel Sheets (ASTM A444)
2. Manufacture of Corrugated Steel Culverts and Underdrains (AASHTO M-36)
3. Structural Plate for Pipe, Pipe Arches, and Arches (AASHTO M-167)
4. Bituminous Coated Corrugated Steel Pipe and Arches (AASHTO M-190)
5. Sheet Material (ASTM A525)

Bituminous Coated Welded Seam Helically Corrugated Steel Pipe

The pipe shall be fabricated from flat coils. The base metal, spelter coating, and fabrication shall meet the applicable requirements of AASHTO M-36. Corrugations shall be 2-2/3-inch pitch by 1/2-inch depth. Each pipe shall have two annular corrugations rolled in each end. After the ends are rolled, the pipe shall be coated with bituminous material, inside and outside, to a minimum thickness of 0.05 inch as required by AASHTO M-190 for Type A coating

Bituminous Coated and Paved Invert Welded Seam Helically Corrugated Steel Pipe

The pipe shall be fabricated from flat coils. The base metal, spelter coating, and fabrication shall meet the applicable requirements of AASHTO M-36. Corrugations shall be 2-2/3-inch pitch by 1/2-inch depth. Each pipe shall have two annular corrugations rolled in each end

After the ends are rolled, the pipe shall be coated with bituminous material, inside and outside, to a minimum thickness of 0.05 inch. In addition, bituminous material shall be applied to form a

smooth pavement in the bottom 25% of pipe and in the bottom 40% of pipe arch as required by AASHTO M-190 for Type C coating

Smooth Lined Welded Seam Helically Corrugated Steel Pipe

The pipe shall be fabricated from flat coils. The base metal, spelter coating, and fabrication shall meet the applicable requirements of AASHTO M-36. Corrugations shall be 2-2/3-inch pitch by 1/2-inch depth. Each pipe shall have two annular corrugations rolled in each end. Each pipe shall have two lifting lugs welded to the outside of the pipe

After the ends have been rolled, the pipe shall be coated with bituminous material, inside and outside, to a minimum thickness of 0.05 inch as required by AASHTO M-190 for Type A coating. The pipe shall be centrifugally lined on the inside with bituminous material to form a smooth surface which fills the corrugations to a minimum thickness of 1/8 inch above the crests of the corrugations. The bituminous lining material shall meet the requirements of AASHTO M-190

Bituminous Coated Pipe Couplings
Coupling bands shall be the same base metal and spelter coating as the pipe. Bands shall be 0.064-inch thick, and 10-1/2 inches wide. Bands shall be bituminous coated and shall have two corrugations 7-5/8 inches center to center. Bands 12-inch diameter through 30-inch diameter shall be one-piece, and 36-inch diameter through 96-inch diameter shall be two-piece. Band laps 12-inch diameter through 48-inch diameter shall be joined by one galvanized bar, bolt, and strap connector. Band laps 54-inch diameter through 96-inch diameter shall be joined by two galvanized bar, bolt, and strap connectors

Aluminum Alloy Structural Plate

Aluminum alloy plates and fasteners intended for use in the construction of structural plate pipe and pipe arch for storm sewers shall meet the applicable requirements of AASHTO M-219. The plate shall be fabricated from aluminum alloy 5052 H141. The chemical composition of the plates shall conform to ASTM B209 alloy 5052

The corrugations shall have a pitch of 9 inches plus or minus 3/8 inch and depth of 2-1/2 inches plus or minus 1/8 inch. The inside crown radius of the corrugations shall be not less than 2 inches

The structural plate pipe or arches shall be assembled in accordance with the manufacturer's erection instructions and in accordance with the drawings

Aluminized Steel Pipe and Arches

Aluminized coated corrugated steel pipe and pipe arch intended for use in the construction of storm sewers shall meet the applicable requirements of AASHTO M-36. Sheet material shall meet the latest revision of ASTM A525 and AASHTO M-274. The coils from which the pipe is produced shall be coated with 1.0 ounce per square foot of commercially pure aluminum

Pipe shall be furnished circular or as a pipe-arch shape as required and shall be fabricated with helical corrugations and a continuous welded seam extending from end to end of each length of pipe

Each end of each pipe with the welded seam shall have two annular corrugations reformed to permit joining with hugger bands

Coupling bands shall be hugger bands

Multi-plate Pipe and Pipe Arches

Multi-plate pipe and pipe arch structures shall be in accordance with AASHTO M-167. They shall be made with steel sections with corrugations 6 inches wide by 2 inches deep running at right angles to the section

Bolts and nuts shall be special heat-treated galvanized 3/4-inch diameter bolts in accordance with ASTM specifications

Multi-plate pipes and pipe arches shall be designed in accordance with the manufacturer's design criteria and in accordance with the drawings

Detailed instructions regarding erection shall be furnished by the manufacturer

PVC Composite Pipe and Fittings

ABS or PVC composite pipe and fittings shall conform to ASTM D 2680, Latest Revision

Corrugated Polyethylene Pipe and Fittings

Corrugated polyethylene pipe shall comply with the requirements fore materials, test methods, dimensions, and marking in accordance with AASHTO M-252 for pipe diameters 6" - 10", AASHTO M-294 for pipe diameters of 12" - 48", and AASHTO MP7 for 54" and 60"

The resin material shall meet ASTM D3350 cell classification 335400C

The pipe lengths shall be connected using a gasketed, bell and spigot joint. This joint shall consist of a factory installed, gasketed double bell polyethylene coupling, a factory welded bell or integral bell. The spigot end of the pipe shall be furnished with a factory installed elastomeric profile "O-ring" rubber gasket that meets ASTM F-477

The pipe shall be shipped with a removable wrap to protect the gasket. Provide lubrication to the joint prior to pushing together. At least two (2) corrugations of the spigot end must insert into the bell end

All HDPE pipe shall be certified through the Plastic Pipe Institute (PPI) Third Party Certification Program. All HDPE pipe delivered and installed shall bear the Third Party Administered PPI Seal

Subsurface Drain Tiles

Double wall smooth bore corrugated polyethylene tile, manufactured under specification ASTM F 667, shall be required for all subsurface drain tile installed in swales. Single wall corrugated polyethylene drain tile shall be required for curb sub-grade drainage

Polyethylene tile shall possess male and female pipe ends, which allow the construction of overlapping, gasket pipe joints, in conformance with the requirements of ASTM D 3212. The gasket material shall conform to all requirements of ASTM F 477. As an alternative, pipe joints utilizing external couplings bands will be accepted, provided the minimum AASHTO requirements for satisfying soil tightness are also achieved

Storm sewer pipe shall be of the size shown on the drawings and shall meet all requirements of these specifications. Subsurface drains (SSD) shall have a minimum of four hundred (400) feet between structures. Subsurface drains shall have clean-outs installed every 400 feet or at changes in direction

CHAPTER 500 INSTALLATION OF STORMWATER FACILITIES

SECTION 501 GENERAL

501.01 Pipe Cover, Grade, and Separation from Sanitary Sewers

Pipe

Pipe grade shall be such that, in general, a minimum of 2.0 feet of cover is maintained over the top of the pipe. If the pipe is to be placed under pavement, then the minimum pipe cover shall be 2.5 feet from top of pavement to top of pipe. Uniform slopes shall be maintained between inlets, manholes and inlets to manholes. Final grade shall be set with full consideration of the capacity required, sedimentation problems, and other design parameters. Minimum and maximum allowable slopes shall be those capable of producing velocities of between 2.5 and 10 feet per second, respectively, when the sewer is flowing full. Maximum permissible velocities for various storm sewer materials are listed in Table 501-1. A minimum of 2.0 feet of vertical separation between storm sewers and sanitary sewers shall be required. When this is not possible, the sanitary sewer must be encased in concrete or ductile iron within 5 feet, each side, of the crossing centerline

Rear Yard Swale

Rear yard swales shall have a minimum slope of 2% gradient. Swales less than a 2% gradient are required to have double-wall perforated drain tile installed two (2) feet below the invert of the swale. Minimum swale slope shall be greater than 1% gradient. Subsurface drains shall have a minimum slope of .5% gradient

Proposed road grades will be required to be graded within two (2) inches of the proposed sub-grade prior to installation of SSD. Trench width for SSD shall be a minimum of three (3) inches on both sides of the SSD, with a minimum trench width of twelve (12) inches

501.02 Alignment

Storm sewers shall be straight between manholes and or inlets

501.03 Manholes/Inlets

All Manholes and Inlets must be pre-stamped with an appropriate message per the Town of Westfield Public Works Department Standards. Manholes and/or inlets shall be installed to provide human access to continuous underground storm sewers for the purpose of inspection and maintenance. The casting access minimum inside diameter shall be no less than 22 inches or a rectangular opening of no less than 22 inches by 22 inches. Manholes shall be provided at the following locations

1. Where two or more storm sewers converge
2. Where pipe size or the pipe material changes
3. Where a change in horizontal alignment occurs
4. Where a change in pipe slope occurs
5. At intervals in straight sections of sewer, not to exceed the maximum allowed. The maximum distance between storm sewer manholes shall be as shown in Table 501-2

In addition to the above requirements, a minimum drop of 0.1 foot through manholes and inlet structures should be provided. Pipe slope should not be so steep that inlets surcharge (i.e. hydraulic grade line should remain below rim elevation)

CITY OF WESTFIELD SPECIFICATIONS
WESTFIELD HIGH SCHOOL ADDITION
WESTFIELD WASHINGTON SCHOOLS
322 WEST MAIN STREET
WESTFIELD, IN 46074

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Date 02-06-09

COVERING: DESIGN

Sheet C903

02-06-09

Project Number 040338-20201

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Manhole/inlet inside sizing shall be according to the Town of Westfield Public Works Department Standards. Note that the Town of Westfield Public Works Department may require the applicant to provide pre-treatment BMPs prior to discharge of the storm sewer line into a pond.

501.04 Installation and Workmanship

Bedding and backfill materials around storm sewer pipes, sub-drains, and the associated structures shall be according to the Town of Westfield Public Works Department Standards. The specifications for the construction of storm sewers and sub-drains, including backfill requirements, shall not be less stringent than those set forth in the latest edition of the "INDOT Standard Specifications". Additionally, ductile iron pipe shall be laid in accordance with American Water Works Association (AWWA) C-600 and clay pipe shall be laid in accordance with either American Society of Testing Materials (ASTM) C-12 or the appropriate American Association of State Highway and Transportation Officials (AASHTO) specifications. Dips/sags on newly installed storm systems will not be allowed. Also, infiltration from cracks, missing pieces, and joints shall not be allowed. Variations from these standards must be justified and receive written acceptance from the Town of Westfield Public Works Department. All structures shall require inspection prior to backfill.

501.05 Special Hydraulic Structures

Special hydraulic structures required to control the flow of water in storm runoff drainage systems include junction chambers, drop manholes, stilling basins, and other special structures. The use of these structures shall be limited to those locations justified by prudent planning and by careful and thorough hydraulic engineering analysis. Certification of special structures by a certified Structural Engineer may also be required.

The use of stormwater lift stations will not be permitted under any circumstances.

501.06 Connections to Storm Sewer System

Unless otherwise approved, perforated subsurface drain tiles, footer drains, or sump pumps lines shall connect to a storm structure. Storm sewer connections shall be provided by either precast or drilled holes, which are to be a minimum of two (2) inches larger the O.D. of the connecting tile. Drain tile connections shall be made with either "Tee" or "Wye" method.

Blind connections to storm sewer pipes shall not be allowed.

Subsurface tile as specified herein may be used to convey water collected in sump pits and footer drains to an acceptable storm sewer outlet, provided these drain tiles are properly sized to accept these flows.

Gutter or building drains shall not be allowed to outlet directly into storm sewer systems.

To allow any connections to the storm sewer system, provisions for the connections shall be shown in the drainage calculations for the system. Specific language shall be provided in the protective covenants on the record plat, or with the parcel deed of record, noting the ability or inability of the system to accommodate any permitted connections, for example sump pumps and footing drains.

1. Sump pumps installed to receive and discharge groundwater or other stormwater shall be connected only into "T" subsurface drain (SSD) lateral connection if provided. When connection to the SSD is not possible, discharge pipe must daylight. Sump pumps installed to receive and discharge floor drain flow or other sanitary sewage shall be connected to the sanitary sewers. A sump pump shall be used for one function only, either the discharge of stormwater or the discharge of sanitary sewage, each being connected to the respective receiving system only.

2. **Footing drains and perimeter drains** shall be connected only into "T" subsurface drain (SSD) lateral connection if provided. When connection to the SSD is not possible, discharge pipe must daylight.

3. **All roof downspouts, roof drains, or roof drainage piping** shall discharge onto the ground and shall not be directly connected to the storm drainage system. Variation from this requirement may be requested and granted by the Town of Westfield Public Works Department in special circumstances. No downspouts or roof drains shall be connected to the sanitary sewers.

4. **Garage and Basement floor drains and water softener discharge** shall not be connected to the storm sewers.

5. **Swimming Pool drains** shall not be connected to the storm sewers unless the water is dechlorinated prior to being connected to the storm sewer.

501.07 Inspection and Rejection of Pipe

The quality of all materials, the process of manufacture, and the finished pipe shall be subject to inspection and approval by the Westfield Public Works Department or designee. Such inspection may be made at the place of manufacture or on the work after delivery, or at both places; and the pipe shall be subject to rejection at any time on account of failure to meet any of the specifications requirements even though sample pipes may have been accepted as satisfactory at the place of manufacture.

Prior to being lowered into the trench, each pipe shall be carefully inspected and those not meeting the specifications shall be rejected and at once removed from the work.

The Westfield Public Works Department shall have the right to cut cores from such pieces of the concrete pipe as he desires for such inspection and tests as he may wish to apply. The Developer/Contractor shall pay for the samples of an Independent Laboratory Testing.

Holes left by the removal of cores shall be filled in an approved manner by and at the expense of the manufacturer of the pipe.

The Westfield Public Works Department shall also have the right to take samples of concrete after it has been mixed, or as it is being placed in the forms or molds, and to make such inspection and tests thereof as he may wish.

Any pipe which has been damaged after delivery will be rejected and replaced solely at the Contractor's expense.

501.08 Handling Pipe

Each pipe section shall be handled into its position in the trench only in such manner and by such means as the Westfield Public Works Department or designee approves as satisfactory. As far as practicable, the Contractor will be required to furnish slings, straps, and other approved devices to permit satisfactory support of all parts of the pipe when it is lifted.

501.09 Notice to Westfield Public Works Department

The Westfield Public Works Department or designee shall be notified when the pipes are to be laid in the trench. At least 15 feet of the pipe shall, under ordinary circumstances, be laid before covering begins.

501.10 Laying Pipe

All pipes shall be reinspected for soundness and damage due to handling immediately before being lowered into the trench. Any pipe found to be unsound or damaged will be rejected and shall be removed immediately from the site of the work.

No portion of a Storm Sewer pipe, open culvert, manhole, inlet, or subsurface tile system shall be installed directly or indirectly onto frozen ground or with frozen backfill materials.

Where ground water is encounter, the contractor shall make every effort necessary to secure a dry trench bottom prior to installation of the storm water system. The contractor shall be required to maintain the groundwater level below the base of the excavation. The Town, nor the Westfield Public Works Department, will not assume any liability for the actions of the Developer or Contractor in the performance of the required dewatering operation. If trench conditions outlined in this section cannot be achieved, the Westfield Public Works Department or designee may terminate installation until such efforts can be achieved.

All pipes shall be laid accurately to the required line and grade as shown on the drawings, and in the manner prescribed by the pipe manufacturer and appropriate ASTM Specifications, to form a close, concentric joint with the adjoining pipe end to bring the invert of each section to the required grade. The supporting of pipe on block will not be permitted.

Pipe lying shall precede upgrade, beginning at the lower end of the sewer.

Practically watertight work is required, and the Contractor shall construct the sewers with the type of joint specified.

Joints between precast structures shall be sealed with (1) An approved rubber gasket manufactured and installed in accordance with ASTM C 443, latest version, (2) A ½ inch diameter non-asphaltic mastic (Kent Seal or approved equal) conforming to AASHTO M-198 and Federal Specifications SS 521-A, or 4 (3) mortar or butyl rubber sealed on the outside and (4) mortar sealed on the inside and brushed smooth.

The annular space between the pipe and precast structure walls shall be filled inside and outside with a grout mixture composed of 2 parts of fine aggregate and one part of Portland Cement or Class "A" Concrete.

All pipes shall be laid to the line and grade as shown on the drawings. Variations from a uniform line and grade as shown on the drawings shall be cause for the line to be rejected.

The ends of the pipe shall be satisfactorily cleaned just before laying, and the joint shall be made in a satisfactory manner in accordance with the recommendations of the manufacturer on particular type of joint. All joint work shall be done by experienced workmen.

All pipes shall be bedded as described in this specification under Pipe Bedding. Bell holes shall be excavated in advance of pipe laying so the entire pipe barrel will bear uniformly on the prepared subgrade.

Each length of pipe shall be mechanically pulled "home" with a winch or come-along against the section previously laid and held in place until the trench and bedding are prepared for the next pipe section. Care shall be taken in laying the pipe so not to damage the bell or the spigot end of the pipe. Mechanical means consisting of a cable placed inside the pipe with a winch, jack, or come-along shall be considered to pull the pipe home where pushing the pipe will not result in a joint going completely home and staying in place.

The Contractor shall use laser beam equipment, surveying instruments, or other proven techniques to maintain accurate alignment and grade.

Open excavation shall be satisfactorily protected at all times. At the end of each day's work, the open ends of all pipes shall be protected against the entrance of animals, children, earth, or debris by bulkheads or stoppers. The bulkheads or stoppers shall be perforated to allow passage of water into the installed pipe line to prevent flotation of the pipe line. Any earth or other material that may find entrance into the main sewer or into any lateral sewer through any such open end of unplugged branch must be removed at the Contractor's expense. The cost of all such plugs, and the labor connected therewith, must be included in the regular bid for the sewers.

Storm sewer which outlets into a Hamilton County Regulated Drain shall be approved, inspected, and constructed per the latest standards of the Hamilton County Surveyor's Office Standards.

501.11 Pipe Bedding and Haunching

Each pipe section shall be laid in a firm foundation of bedding material and haunched and backfilled with care.

Prior to pipe installation, carefully bring bedding material to grade along the entire length of pipe to be installed. To provide adequate support for the pipe, the following bedding procedures are recommended.

When Angular 60 to 12 mm (1/4 to 1/2-inch) clean graded stone, slag, or crushed stone material is used for bedding, little or no compaction is necessary due to the nature of the angular particles. A depth of 4 to 6 inches is generally sufficient to provide uniform bedding. If Class I material is used for bedding, it must also be utilized for haunching up to or higher than the spring line of the pipe to avoid loss of side support through migration of Class II haunching material into the bedding.

1. Take care with coarse sands and gravels and maximum size 20 mm (3/4-inch) materials, to provide uniformly compacted bedding. Excavate the bedding material or place it to a point above the pipe bottom, determining such point by the depth of loose material resulting in the preparation of the bedding and the amount of compaction that will be required to bring the material to grade. Use hand or mechanical tamping to compact the bedding material to a minimum 85% Standard Proctor Density.

2. Slightly damp material will generally result in maximum compaction with a minimum of effort. If water is added to improve compaction or it water exists in the trench, take care to avoid saturation of Class II material, which could result in additional stability problems. Check grade of bedding after compaction.

Bedding material shall have a minimum thickness beneath the pipe of 4 inches (100 mm) or one-eighth of the outside diameter of the pipe, whichever is greater, and shall extend up the sides of the pipe one-sixth of the outside diameter of the pipe.

The rigid pipe, such as concrete or ductile iron, backfill between the bedding material and a plane 12 inches (300 mm) over the top of the pipe shall be hand-placed finely divided earth, free from debris and stones, or granular backfill if required.

For flexible pipe, corrugated metal pipe, the placement of embedment material or haunching around the pipe must be done with care. The ability of the pipe to withstand loading in a trench depends a large part on the method employed in its installation. If crushed stone, pea gravel, or graded gravel or sand is used to backfill between the bedding material and a plane 12 inches (300 mm) over the top of the pipe, it shall be hand placed. If fine sand, silt, or clayey gravels are used for initial backfilling over the pipe, the material shall be hand placed in 6- to 8-inch layers and hand compacted on both sides of the pipe to an elevation 12 inches (300 mm) over the top of the pipe. Care should be taken so not to compact directly over the pipe.

In yielding subsoils, the trench bottom shall be undercut to the depth necessary and backfilled with graded, crushed stone to form a firm foundation.

Where excavation occurs in rock or hard shale, the trench bottom shall be undercut and a minimum of 6 inches (150 mm) crushed stone bedding placed prior to pipe installation.

501.12 Concrete Cradle (Class "A" Bedding)

Concrete cradles shall be constructed of Class "B" concrete and of the design shown on the detailed drawings.

501.13 Manholes and Other Structures

Manholes and other structures are to be constructed at locations shown on the drawings and in accordance with the following specifications.

Precast concrete manhole sections shall conform to ASTM Designation C478, except as modified herein.

1. The joint design of the precast sections shall consist of a bell or groove on one end of the unit of pipe and a spigot or tongue on the adjacent end of the joining section.

2. The joint shall consist of a flat rubber gasket attached to the spigot end of the precast manhole section and shall conform to Sections 6.1.6, 6.1.7 and 9 of ASTM Designation 443, latest revision.

Openings in manhole sections for sewer connections shall be cut at the point of manufacture and shall be circular or horseshoe shaped with grooved or roughened surfaces to improve mortar bond.

Manhole bases shall be cast-in-place concrete, reinforced as shown on the Standard Detail Sheet. Manhole bases shall be cast on a minimum of 6 inches of compacted crushed stone.

Manhole channels or inverts (flow lines) shall be preformed and poured with Class "B" concrete to the spring line of the connecting pipe. The finished invert shall be a semi-circular shaped smooth channel directing the flow to the downstream sewer.

Manhole frames and lids shall be of good quality cast iron, conforming to ASTM Designation A48 and as shown on Detail #2 on the Standard Detail Sheet (See Section 2-11 C-1). Unless specifically designated otherwise, manhole castings shall be the non-locking type. The joint between the casting frame and cone section shall be fully mortared or gasketed and coated with butyl rubber or a coal tar epoxy coating upon reaching its final set to become a watertight joint.

Manhole steps shall be made from a steel reinforcing rod encapsulated in a copolymer polypropylene resin. Steps shall be placed as shown on the drawings.

TABLE 501-1

Typical Values of Manning's "n"		
Material	*Manning's "n"*	*Maximum Velocities (feet/second)*
□ **Closed Conduits**		
Concrete	0.013	10
Vitrified Clay	0.013	10
HDPE	0.012	10
PVC	0.011	10
□ **Circular CMP, Annular Corrugations, 2 2/3 x ½ inch**		
Unpaved	0.024	7
25% Paved	0.021	7
50% Paved	0.018	7
100% Paved	0.013	7
Concrete Culverts	0.013	10
HDPE or PVC	0.012	10
□ **Open Channels**		
Concrete, Trowel Finish	0.013	10
Concrete, Broom Finish	0.015	10
Gunite	0.018	10
Riprap Placed	0.030	10
Riprap Dumped	0.035	10
Gabion	0.028	10
New Earth (1)	0.025	4
Existing Earth (2)	0.030	4
Dense Growth of Weeds	0.040	4
Dense Weeds and Brush	0.040	4
Swale with Grass	0.035	4

Source of manning "n" values: HERPICC Stormwater Drainage Manual, July 1995
(1) New earth (uniform, sodded, clay soil)
(2) Existing earth (fairly uniform, with some weeds)

TABLE 501-2

Maximum Distance Between Manholes	
Size of Pipe (Inches)	Maximum Distance (Feet)
All sizes	400

CITY OF WESTFIELD SPECIFICATIONS
WESTFIELD HIGH SCHOOL ADDITION
WESTFIELD WASHINGTON SCHOOLS
322 WEST MAIN STREET
WESTFIELD, IN 46074

Cripe Architects + Engineers
3939 PRIORITY WAY SOUTH DRIVE, SUITE 400
INDIANAPOLIS, INDIANA 46240
(317) 844-6777 FAX (317) 706-6464
E-Mail cripe@cripe.biz

CERTIFIED BY: David A. Lach, Registered PE 10000126, State of Indiana, Professional Engineer
Date: 02-06-09

Sheet: C904
Date: 02-06-09
Project Number: 040338-20201

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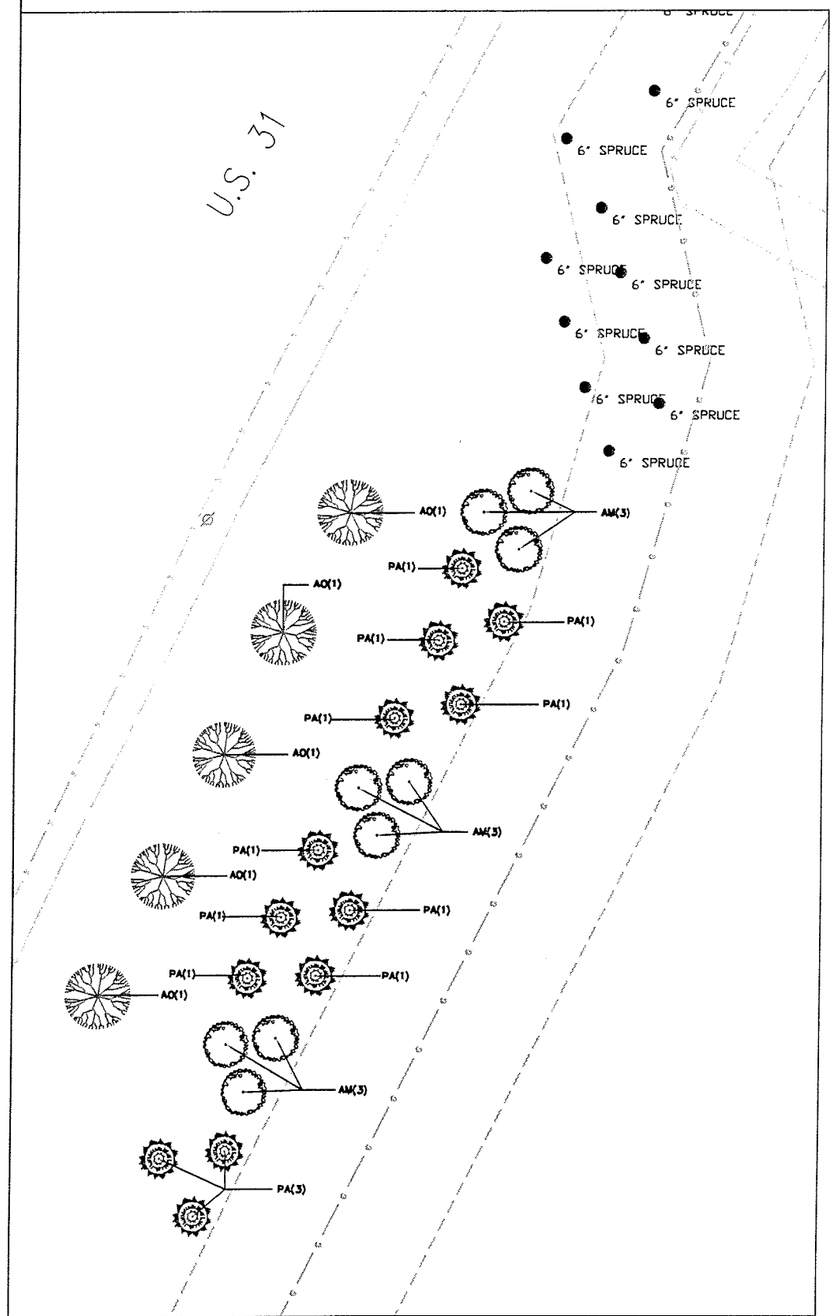
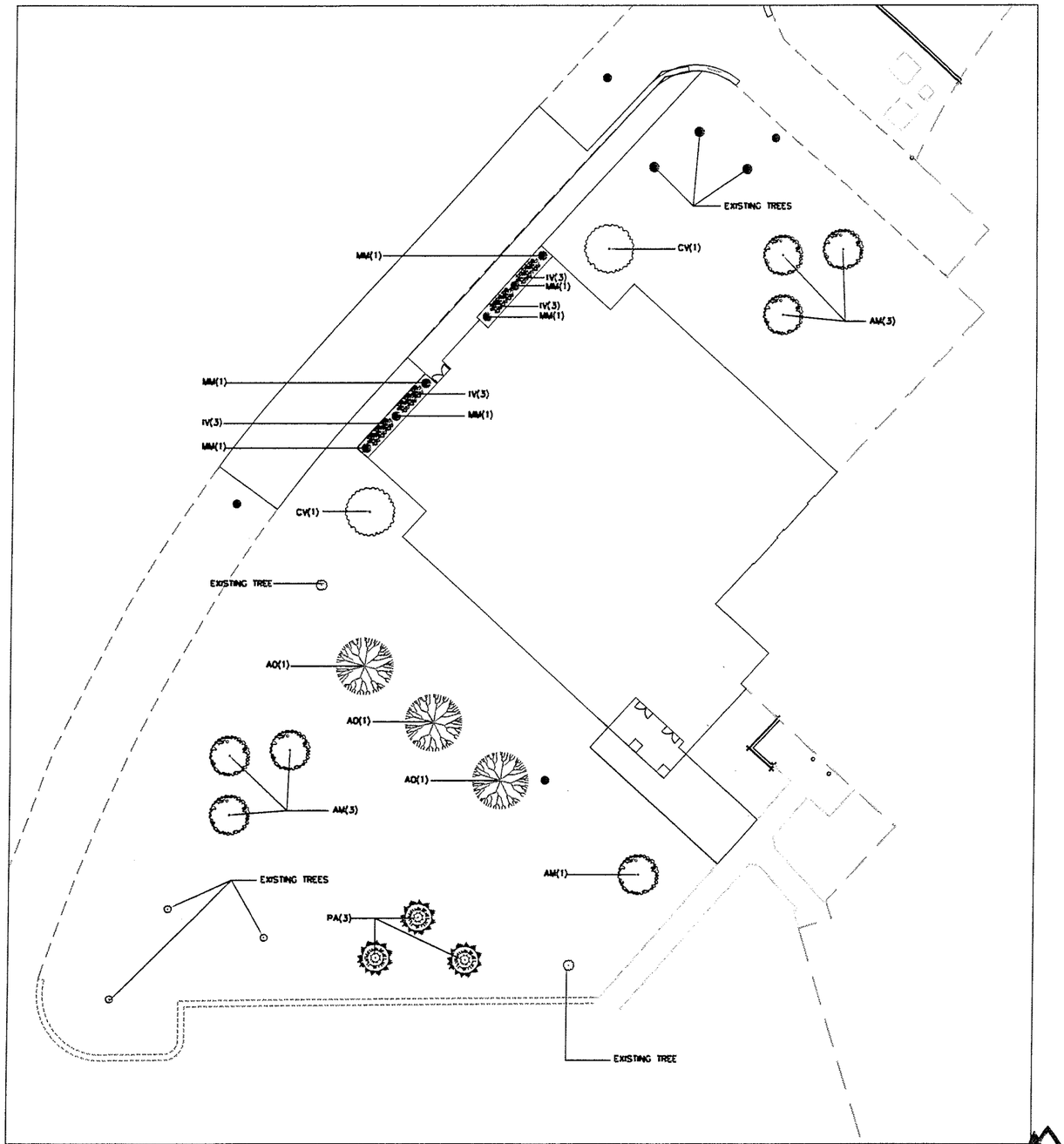


1 L1.0 BUFFER YARD LANDSCAPE PLAN
SCALE: 1"=20'



2 L1.0 ADDITION LANDSCAPE PLAN
SCALE: 1"=20'

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LANDSCAPE PLAN

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WESTFIELD WASHINGTON SCHOOLS

322 WEST MAIN STREET
WESTFIELD, IN 46074

CERTIFIED BY:

DAVID A. LANGE REGISTERED PE 10000128 STATE OF INDIANA PROFESSIONAL ENGINEER

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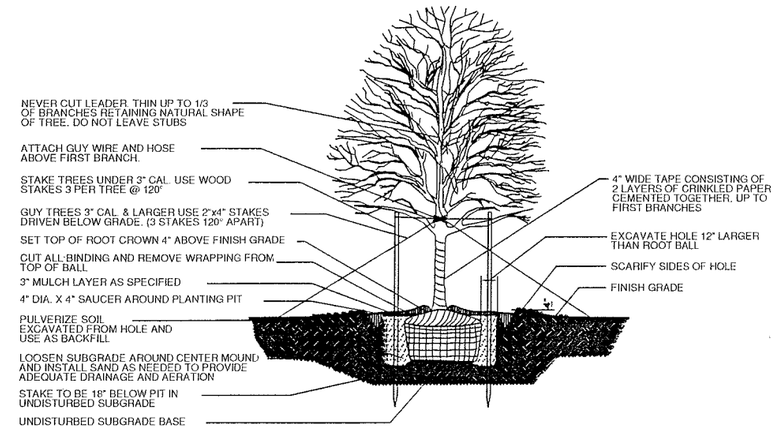
PLANT MATERIAL SCHEDULE

KEY	BOTANICAL NAME	COMMON NAME	QUAN.	SIZE
AO	ACER R. 'OCTOBER GLORY'	OCTOBER GLORY MAPLE	8	2-1/2" B&B
AM	AMELANCHIER LAEVIS 'CUMULUS'	ALLEGHENY SERVICEBERRY	16	1 3/4" B&B
CV	CRATAEGUS VIRIDIS 'WINTER KING'	WINTER KING HAWTHORN	2	2" B&B
IV	ITEA VIRGINICA 'HENRY'S GARNET'	HENRY GARNET SWEETSPIRE	12	3 GALLON
MM	MISCANTHUS S 'MORNING LIGHT'	MORNING LIGHT MAIDEN GRASS	6	3 GALLON
PA	PICEA ABIES	NORWAY SPRUCE	16	7-8' B&B



SHADE TREE PLANTING DETAIL

NOT TO SCALE

GENERAL NOTES:

1. FOR SITE LAYOUT INFORMATION SEE CIVIL DRAWINGS

2. VERIFY UNDERGROUND UTILITY LOCATIONS PRIOR TO PLANT INSTALLATION

3. CONTRACTOR TO VERIFY QUANTITIES; NOTIFY LANDSCAPE ARCHITECT OF ANY DISCREPANCIES.

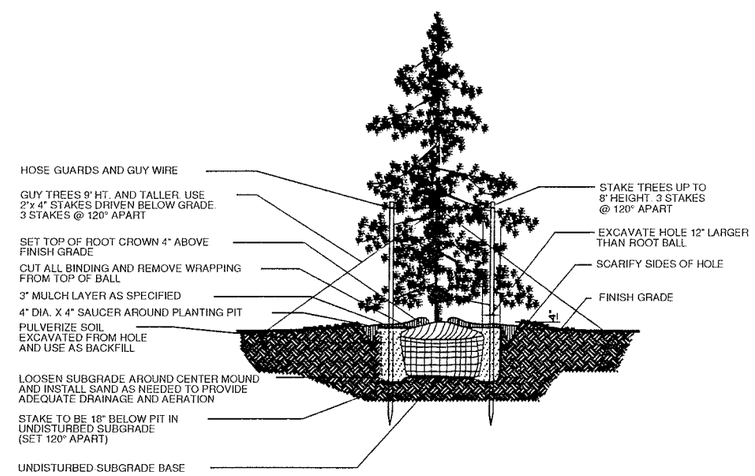
4. CONTRACTOR TO VERIFY FIELD CONDITIONS, NOTIFY LANDSCAPE ARCHITECT OF ANY DISCREPANCIES BETWEEN DRAWINGS AND FIELD CONITIONS.

5. STAKE ALL TREES AND SHRUBS AS INDICATED BY INDUSTRY STANDARDS.

6. CONTRACTOR TO REGRADE, REPAIR AND REPLANT ALL AREAS DISTURBED BY CONSTRUCTION, INCLUDES ANY AREAS OFF-PROPERTY AND OR OTHERWISE NOT INDICATED ON PLANS.

7. CONTRACTOR SHALL MAINTAIN POSITIVE DRAINAGE IN LAWN AND PLANTING BED AREAS.

8. CONTRACTOR SHALL USE TREE & SHRUB DETAILS AS PLANTING GUIDELINES.



EVERGREEN TREE PLANTING DETAIL

NOT TO SCALE

CAUTION !!

THE LOCATIONS OF ALL EXISTING UNDERGROUND UTILITIES SHOWN ON THIS PLAN ARE BASED UPON ABOVE GROUND EVIDENCE (including, but not limited to, manholes, inlets, valves, and marks made upon the ground by others) AND ARE SPECULATIVE IN NATURE. THERE MAY ALSO BE OTHER EXISTING UNDERGROUND UTILITIES FOR WHICH THERE IS NO ABOVE GROUND EVIDENCE OR FOR WHICH NO ABOVE GROUND EVIDENCE WAS OBSERVED. THE EXACT LOCATIONS OF SAID EXISTING UNDERGROUND UTILITIES SHALL BE VERIFIED BY THE CONTRACTOR PRIOR TO ANY AND ALL CONSTRUCTION.

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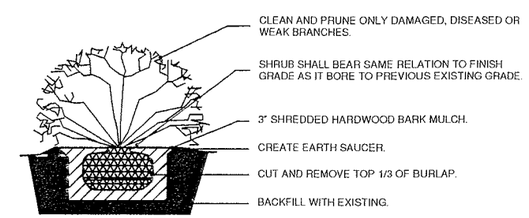
- INDIANA UNDERGROUND -



SHRUB PLANTING DETAIL

NOT TO SCALE

REMOVE ALL STAKING AS SOON AS THE TREE HAS GROWN SUFFICIENT ROOTS TO OVERCOME THE PROBLEM THAT REQUIRED THE TREE TO BE STAKED. STAKES SHALL BE REMOVED NO LATER THE END OF THE FIRST GROWING SEASON AFTER PLANTING.

TREES NORMALLY DO NOT NEED TO BE STAKED AND STAKING CAN BE HARMFUL TO THE TREE. STAKING SHOULD BE DONE ONLY WITH THE APPROVAL OF THE LANDSCAPE ARCHITECT IF IT IS EXPECTED THAT THE TREE WILL NOT BE ABLE TO SUPPORT ITSELF. THE FOLLOWING ARE REASONS WHY TREES DO NOT REMAIN STRAIGHT.

- o TREES WITH POOR - QUALITY ROOT BALLS OR ROOT BALLS THAT HAVE BEEN CRACKED OR DAMAGED. REJECT RATHER THAN STAKE.
- o TREES THAT HAVE GROWN TOO CLOSE TOGETHER IN THE NURSERY, RESULTING IN WEAK TRUNKS. REJECT RATHER THAN STAKE.
- o PLANTING PROCEDURES THAT DO NOT ADEQUATELY TAMP SOILS AROUND THE ROOT BALL. CORRECT THE PLANTING PROCEDURE.
- o ROOT BALLS PLACED ON SOFT SOIL. TAMP SOILS UNDER ROOT BALL PRIOR TO PLANTING.
- o ROOT BALLS WITH VERY SANDY SOIL OR VERY WET CLAY SOIL. STAKING ADVISABLE.
- o TREES LOCATED IN A PLACE OF EXTREMELY WINDY CONDITIONS. STAKING ADVISABLE.

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LANDSCAPE PLAN
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WESTFIELD WASHINGTON SCHOOLS
322 WEST MAIN STREET
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CERTIFIED BY:

DAVID A. LACH
REGISTERED
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STATE OF INDIANA
PROFESSIONAL ENGINEER

Date 02-06-09

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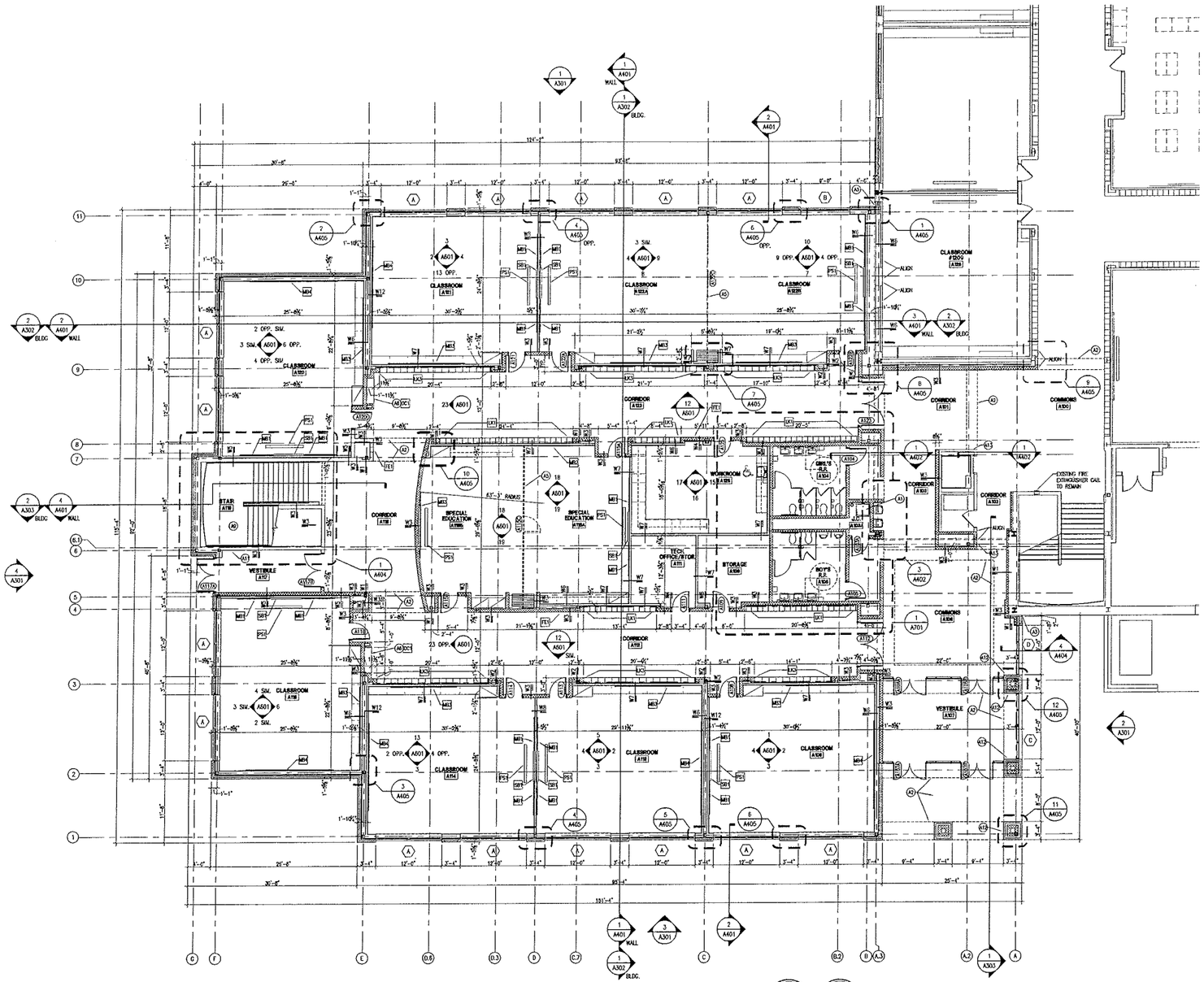


FIRST FLOOR PLAN - UNIT 'A'

1 / A201 SCALE: 1/8" = 1'-0"

GENERAL NOTES

1. COORDINATE THE WORK OF EACH TRADE WITH THE WORK OF ALL OTHER TRADES.
2. ALL DIMENSIONS ARE FROM FACE OF BLOCK OR FACE OF GYPSUM BOARD. ANY DIMENSIONS NOT SHOWN OR DEEMED QUESTIONABLE ARE TO BE VERIFIED WITH THE ARCHITECT. DO NOT SCALE FROM THE DRAWINGS.
3. REFER TO WALL TYPES SCHEDULE ON SHEETS A001 AND A002 TO DETERMINE WHICH WALLS EXTEND TO DECK. SEE STRUCTURAL FOR TOP SUPPORT DETAIL. WHERE METAL STUDS EXTEND TO DECK, PROVIDE SLIP CONNECTIONS FOR ROOF/ FLOOR DEFLECTION. STEEL STUD AND G.W.B PARTITIONS THAT DO NOT EXTEND TO ROOF OR FLOOR DECK ARE TO BE BRACED TO STRUCTURE. REFER TO STRUCTURAL. REFER TO REFLECTED CEILING PLANS FOR FIRE-RATING PREDEFINEDS OF INTERIOR PARTITIONS.
4. ALL STEEL STUDS ARE TO BE BRACED ACCORDING TO MANUFACTURER (UNT HEIGHT/L/240).
5. WHERE INSULATED OR SOUND WALLS EXTEND TO DECK, FILL DECK FLUTES WITH INSULATION/ SOUND ATTENUATION.
6. ALL CONCRETE MASONRY UNITS (CMU) SHALL BE LAID RUNNING BOND U.N.O.
7. REFER TO PLUMBING PLANS FOR LOCATIONS OF FLOOR DRAINS.
8. WHERE ACCESS PANELS ARE SHOWN IN TOILET ROOM CHASES, FINAL LOCATION SHALL BE COORDINATED WITH OTHER TRADES PRIOR TO INSTALLATION.
9. REFER TO ARCHITECTURAL DRAWINGS FOR WALL COVER LOCATIONS, SIZES, AND QUANTITIES.
10. FOR CASEWORK, MILLWORK AND TOILET ACCESSORIES, SEE A700 SERIES DRAWINGS.
11. DOOR AND FRAME NUMBERS CORRESPOND TO ROOM NUMBERS. WHERE MORE THAN ONE DOOR OCCURS IN A ROOM, A SUFFIX HAS BEEN ADDED (I.E. A122A). SEE A600 SERIES DRAWINGS FOR DOOR SCHEDULE. ALL DOOR FRAMES SHALL BE 4" MIN. OFF OF FINISH WALLS U.N.O.
12. PROVIDE MISCELLANEOUS SUPPORTS FOR ALL CEILING AND WALL SUPPORTED ITEMS.
13. PROVIDE FIRE RESISTANT TREATED WOOD BLOCKING SUPPORTS IN STUD WALLS AND/OR GROUTED MASONRY CORES AS REQUIRED TO SUPPORT EQUIPMENT/PLUMBING FIXTURES, ETC.
14. ALL WORK IS TO BE COMPLETED IN STRICT ACCORDANCE WITH ALL APPLICABLE CODES, ORDINANCES, RULES, & STANDARDS, INCLUDING BUT NOT LIMITED TO THE INDIANA BUILDING CODE, THE INDIANA ACCESSIBILITY CODE, THE INDIANA PLUMBING, MECHANICAL AND ELECTRICAL CODES, THE INDIANA FIRE CODE, THE AMERICANS WITH DISABILITIES ACT (ADA), AND APPLICABLE TRADE STANDARDS. ALL APPLICABLE RULES & REGULATIONS ARE TO BE THE MOST CURRENT ADOPTED EDITIONS.
15. AT BUILDING EXPANSION JOINTS, ALL PARTITIONS, CEILINGS, FLOORS, AND ALL WALL, FLOOR OR CEILING MOUNTED ITEMS SHALL BE ANCHORED TO THE BUILDING STRUCTURE ON ONLY ONE SIDE OF THE EXPANSION JOINTS. CONTRACTOR SHALL COORDINATE CONSTRUCTION OR INSTALLATION OF ALL ITEMS NOTED TO ENSURE THAT NO SUCH ITEMS BRIDGE ACROSS THE EXPANSION JOINT.
16. ALL SLAB-ON-GRADE CONTROL JOINTS TO BE CLEANED & CAULKED PRIOR TO PLACEMENT OF FLOOR FINISH.
17. PAINT ALL STEEL DOORS AND FRAMES. REFER TO A600 SERIES DRAWINGS FOR PAINT COLOR.
18. ALL GLASS AT INTERIOR DOOR FRAMES, DOOR LITES & WINDOW FRAMES IS TO BE 1/4" CLEAR TEMPERED GLASS UNLESS OTHERWISE NOTED.

KEYED PLAN NOTES

A1 JANITOR'S SINK. (SEE PLUMBING DRAWINGS)

A2 BULKHEAD ABOVE (REFER TO REFLECTED CEILING PLANS).

A3 2" EXTERIOR BUILDING EXPANSION JOINT ASSEMBLY EQUAL TO "COLORSEAL" BY MAPE. EXTERIOR COLOR OF WEATHER SEAL ASSEMBLY SHALL BE WHITE-COLORED. FILL EXPANSION JOINT WITH BACK SPONGE TO PROVIDE WEATHER STOPPING. PROVIDE 2 INCH JOINT STUFFED WITH INSULATION IN WOVEN BACKUP WALL.

A4 2" INTERIOR EXPANSION JOINT ASSEMBLY AT CMU WALL EQUAL TO BALCO MODEL FS WD-2 AND WCC-2.

A5 OPERABLE PARTITION WALL, MANUAL OPERATION. SEE X/A000.

A6 PRE-MANUFACTURED DISPLAY CASE. SEE DETAIL X/A000.

A7 REMOVE PORTION OF EXISTING WALL AS REQUIRED TO TOOTH IN NEW BLOCK TO MATCH EXISTING.

A8 LOCATE 3 3/4" METAL STUDS IN DEMPSTER EXISTING STEEL BRACING IN ORDER TO FIELD SHIM GYPSUM BOARD FINISH FACE AS CLOSE TO BRACING AS POSSIBLE.

A9 METAL PAN STAIR SYSTEMS WITH PAINTED STEEL HANDRAILS/GUARDRAILS. SEE STAIR SECTIONS FOR MORE INFORMATION.

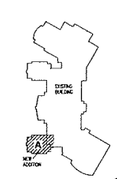
A10 2" EXPANSION JOINT ASSEMBLY AT FLOOR EQUAL TO BALCO MODEL FXX-2 AND EXX-2.

A11 CABINET UNIT HEATER - SEE MECHANICAL.

A12 HANDICAP PUSH END FOR AUTOMATIC DOOR OPERATION

A13 PATCH EXISTING WALL SURFACE AT LOCATION OF REMOVED CMU WALL AS REQUIRED TO MATCH EXISTING ADJACENT CONSTRUCTION TO REMAIN. REPLACE DAMAGED CMU UNITS IN WALL TO REMAIN AS REQUIRED. PREPARE FOR INSTALLATION OF NEW FINISH.

W1	3 5/8" CONCRETE BLOCK WITH HORIZONTAL JOINT REINFORCEMENT @ 16" VERTICALLY. EXTEND BLOCK FULL HEIGHT TO BOTTOM OF DECK.	W4	7 5/8" CONCRETE BLOCK WITH HORIZONTAL JOINT REINFORCEMENT @ 16" VERTICALLY WITH 3/4" METAL FURRING CHANNELS @ 16" O.C. AND 3/4" G.W.B. ONE SIDE. EXTEND BLOCK FULL HEIGHT TO BOTTOM OF DECK. EXTEND FURRING AND G.W.B. TO 6" ABOVE FINISHED CEILING PLANE.	W7	3 5/8" 20 GAUGE STEEL STUDS @ 16" O.C. EXTENDING TO BOTTOM OF DECK ABOVE. PROVIDE DEFLECTION TRACK AT BOTTOM OF DECK TO ALLOW FOR DEFLECTION OF DECK ABOVE. 5/8" G.W.B. ON BOTH SIDES OF STUD, TAPED & FINISHED, AND SOUND ATTENUATION BLANKETS EXTENDING TO WITHIN 1" OF BOTTOM OF DECK ABOVE.	W10	2 1/2" 20 GAUGE STEEL STUDS @ 16" O.C. EXTENDING TO BOTTOM OF DECK ABOVE. PROVIDE DEFLECTION TRACK AT BOTTOM OF DECK TO ALLOW FOR DEFLECTION OF DECK ABOVE. 5/8" G.W.B. ON ONE SIDE OF STUD, TAPED & FINISHED EXTENDING TO WITHIN 1" OF DECK ABOVE.	W13	6" 20 GAUGE STEEL STUDS @ 16" O.C. EXTENDING TO BOTTOM OF DECK ABOVE. PROVIDE DEFLECTION TRACK AT BOTTOM OF DECK TO ALLOW FOR DEFLECTION OF DECK ABOVE. 2 LAYERS ON ONE SIDE AND 1 LAYER ON THE OTHER SIDE OF 5/8" G.W.B., TAPED AND WITH SOUND ATTENUATION BLANKETS, ALL EXTENDING TO WITHIN 1" OF BOTTOM OF DECK ABOVE.
W2	5 5/8" CONCRETE BLOCK WITH HORIZONTAL JOINT REINFORCEMENT @ 16" VERTICALLY. EXTEND BLOCK FULL HEIGHT TO BOTTOM OF DECK.	W5	7 5/8" CONCRETE BLOCK WITH HORIZONTAL JOINT REINFORCEMENT @ 16" VERTICALLY WITH 1" AIRSPACE AND 3 5/8" 20 GAUGE STEEL STUDS @ 16" O.C. WITH 5/8" G.W.B. ONE SIDE. EXTEND BLOCK FULL HEIGHT TO BOTTOM OF DECK. EXTEND STUDS AND G.W.B. TO 6" ABOVE FINISHED CEILING PLANE.	W8	3 5/8" 20 GAUGE STEEL STUDS @ 16" O.C. EXTENDING TO BOTTOM OF DECK ABOVE. PROVIDE DEFLECTION TRACK AT BOTTOM OF DECK TO ALLOW FOR DEFLECTION OF DECK ABOVE. 2 LAYERS ON ONE SIDE AND 1 LAYER ON THE OTHER SIDE OF 5/8" G.W.B., TAPED AND WITH SOUND ATTENUATION BLANKETS, ALL EXTENDING TO WITHIN 1" OF BOTTOM OF DECK ABOVE.	W11	6" 20 GAUGE STEEL STUDS @ 16" O.C. EXTENDING TO BOTTOM OF DECK ABOVE. PROVIDE DEFLECTION TRACK AT BOTTOM OF DECK TO ALLOW FOR DEFLECTION OF DECK ABOVE. 5/8" G.W.B. ON BOTH SIDES OF STUD, TAPED & FINISHED, AND SOUND ATTENUATION BLANKETS EXTENDING TO WITHIN 1" OF DECK ABOVE.		
W3	7 5/8" CONCRETE BLOCK WITH HORIZONTAL JOINT REINFORCEMENT @ 16" VERTICALLY. EXTEND BLOCK FULL HEIGHT TO BOTTOM OF DECK.	W6	3 5/8" 20 GAUGE STEEL STUDS @ 16" O.C. EXTENDING TO BOTTOM OF DECK ABOVE. PROVIDE DEFLECTION TRACK AT BOTTOM OF DECK TO ALLOW FOR DEFLECTION OF DECK ABOVE. 5/8" G.W.B. ON ONE SIDE OF STUD, TAPED & FINISHED EXTENDING TO WITHIN 1" OF DECK ABOVE.	W9	3/4" METAL FURRING CHANNELS @ 16" O.C. AND 3/4" G.W.B. OVER EXISTING WALL CONSTRUCTION. EXTEND FURRING AND G.W.B. TO 6" ABOVE FINISHED CEILING PLANE.	W12	3 5/8" 20 GAUGE STEEL STUDS @ 16" O.C. EXTENDING TO BOTTOM OF DECK ABOVE. PROVIDE DEFLECTION TRACK AT BOTTOM OF DECK TO ALLOW FOR DEFLECTION OF DECK ABOVE. 2 LAYERS OF 5/8" G.W.B. ON ONE SIDE OF STUD, TAPED & FINISHED, AND SOUND ATTENUATION BLANKETS EXTENDING TO WITHIN 1" OF DECK ABOVE.		



KEY PLAN

PLAN NORTH TRUE NORTH

WESTFIELD WASHINGTON SCHOOLS
322 West Main Street
Westfield, Indiana 46074

CSO Architects
ARCHITECTURE · INTERIOR DESIGN
205 East York Street, Suite 210 Indianapolis, Indiana 46240
Tel: 317.248.7500 Fax: 317.574.5957 www.csoinc.com

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PROJECT:

WESTFIELD HIGH SCHOOL CLASSROOM ADDITION

18250 NORTH UNION STREET
Westfield, Indiana 46074

SCOPE DRAWINGS:

These drawings indicate the general scope of the project and are not intended to be construction documents. It is the intent of the drawings to show architectural features and the layout of structural, mechanical and electrical systems.

The drawings do not necessarily indicate all deferrals of work, nor do they indicate the means and methods of the requirements of the Contractor.

On the basis of the general scope indicated or described the trade contractors shall furnish all items required for the proper execution and completion of the work.

REVISIONS:

ISSUE DATE	DRAWN BY	CHECKED BY
02-05-09	LTR	JDO

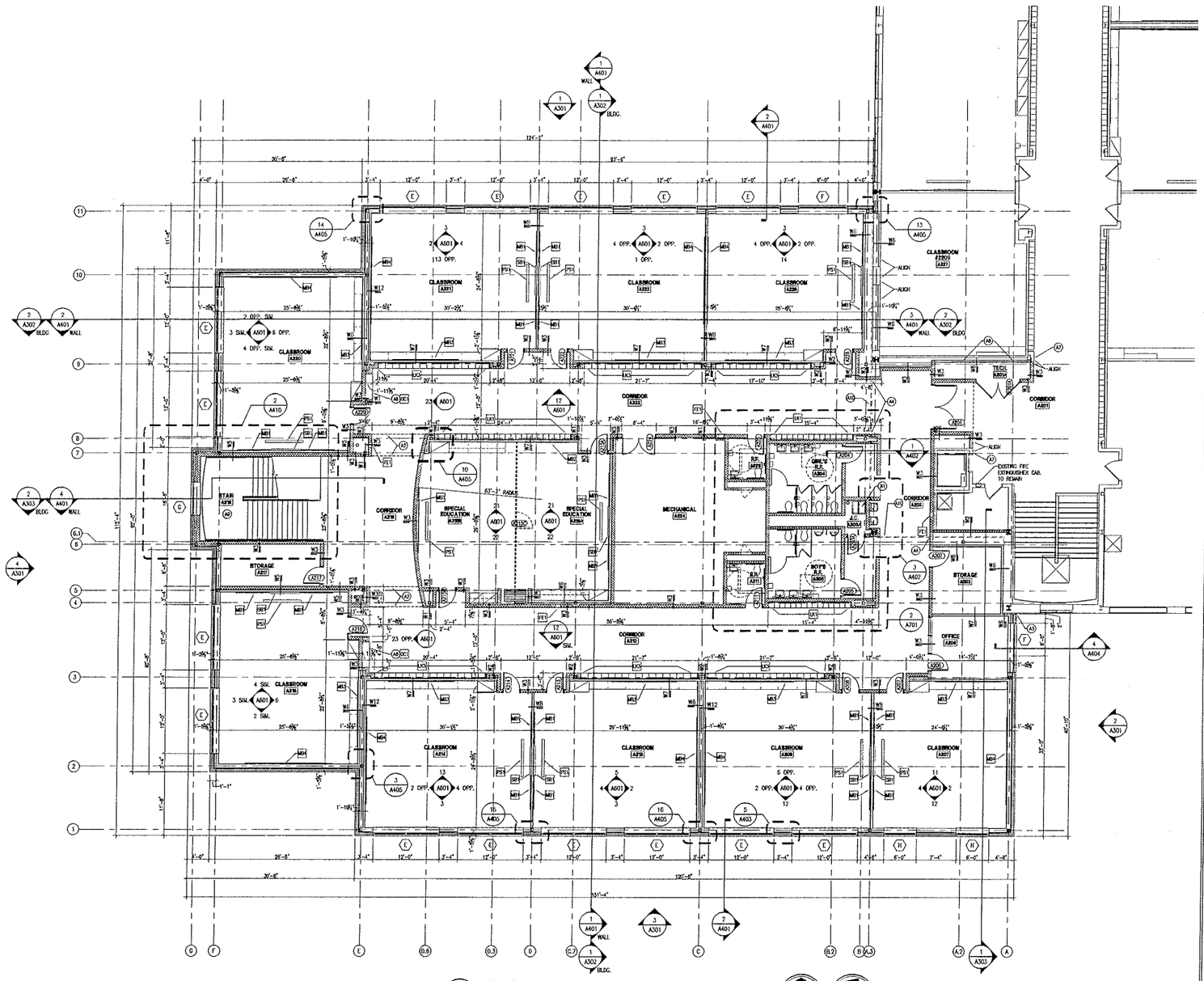
DRAWING TITLE:

FIRST FLOOR PLAN UNIT 'A'

CERTIFIED BY:

DRAWING NUMBER
A201

PROJECT NUMBER
28059



1 A202 **SECOND FLOOR PLAN - UNIT 'A'**
SCALE: 1/8" = 1'-0"

W1	3 5/8" CONCRETE BLOCK WITH HORIZONTAL JOINT REINFORCEMENT @ 16" VERTICALLY. EXTEND BLOCK FULL HEIGHT TO BOTTOM OF DECK.	**W4**	7 5/8" CONCRETE BLOCK WITH HORIZONTAL JOINT REINFORCEMENT @ 16" VERTICALLY WITH ¾" METAL FURRING CHANNELS @ 16" O.C. AND ⅝" G.W.B. ONE SIDE. EXTEND BLOCK FULL HEIGHT TO BOTTOM OF DECK. EXTEND FURRING AND G.W.B. TO 6" ABOVE FINISHED CEILING PLANE.	**W7**	3 5/8" 20 GAUGE STEEL STUDS @ 16" O.C. EXTENDING TO BOTTOM OF DECK ABOVE. PROVIDE DEFLECTION TRACK AT BOTTOM OF DECK TO ALLOW FOR DEFLECTION OF DECK ABOVE. 5/8" G.W.B. ON BOTH SIDES OF STUD, TAPED & FINISHED, AND SOUND ATTENUATION BLANKETS EXTENDING TO WITHIN 1" OF BOTTOM OF DECK ABOVE.	**W10**	2 1/2" 20 GAUGE STEEL STUDS @ 16" O.C. EXTENDING TO BOTTOM OF DECK ABOVE. PROVIDE DEFLECTION TRACK AT BOTTOM OF DECK TO ALLOW FOR DEFLECTION OF DECK ABOVE. 5/8" G.W.B. ON ONE SIDE OF STUD, TAPED & FINISHED EXTENDING TO WITHIN 1" OF DECK ABOVE.	**W13**	8" 20 GAUGE STEEL STUDS @ 16" O.C. EXTENDING TO BOTTOM OF DECK ABOVE. PROVIDE DEFLECTION TRACK AT BOTTOM OF DECK TO ALLOW FOR DEFLECTION OF DECK ABOVE. 2 LAYERS ON ONE SIDE AND 1 LAYER ON THE OTHER SIDE OF 5/8" G.W.B., TAPED AND WITH SOUND ATTENUATION BLANKETS, ALL EXTENDING TO WITHIN 1" OF BOTTOM OF DECK ABOVE.
W2	5 5/8" CONCRETE BLOCK WITH HORIZONTAL JOINT REINFORCEMENT @ 16" VERTICALLY. EXTEND BLOCK FULL HEIGHT TO BOTTOM OF DECK.	**W5**	7 5/8" CONCRETE BLOCK WITH HORIZONTAL JOINT REINFORCEMENT @ 16" VERTICALLY WITH 1" AIRSPACE AND 3 5/8" 20 GAUGE STEEL STUDS @ 16" O.C. WITH ⅝" G.W.B. ONE SIDE. EXTEND BLOCK FULL HEIGHT TO BOTTOM OF DECK. EXTEND STUDS AND G.W.B. TO 8" ABOVE FINISHED CEILING PLANE.	**W8**	3 5/8" 20 GAUGE STEEL STUDS @ 16" O.C. EXTENDING TO BOTTOM OF DECK ABOVE. PROVIDE DEFLECTION TRACK AT BOTTOM OF DECK TO ALLOW FOR DEFLECTION OF DECK ABOVE. 2 LAYERS ON ONE SIDE AND 1 LAYER ON THE OTHER SIDE OF 5/8" G.W.B., TAPED AND WITH SOUND ATTENUATION BLANKETS, ALL EXTENDING TO WITHIN 1" OF BOTTOM OF DECK ABOVE.	**W11**	6" 20 GAUGE STEEL STUDS @ 16" O.C. EXTENDING TO BOTTOM OF DECK ABOVE. PROVIDE DEFLECTION TRACK AT BOTTOM OF DECK TO ALLOW FOR DEFLECTION OF DECK ABOVE. 5/8" G.W.B. ON BOTH SIDES OF STUD, TAPED & FINISHED, AND SOUND ATTENUATION BLANKETS EXTENDING TO WITHIN 1" OF DECK ABOVE.		
W3	7 5/8" CONCRETE BLOCK WITH HORIZONTAL JOINT REINFORCEMENT @ 16" VERTICALLY. EXTEND BLOCK FULL HEIGHT TO BOTTOM OF DECK.	**W6**	3 5/8" 20 GAUGE STEEL STUDS @ 16" O.C. EXTENDING TO BOTTOM OF DECK ABOVE. PROVIDE DEFLECTION TRACK AT BOTTOM OF DECK TO ALLOW FOR DEFLECTION OF DECK ABOVE. 5/8" G.W.B. ON ONE SIDE OF STUD, TAPED & FINISHED EXTENDING TO WITHIN 1" OF DECK ABOVE.	**W9**	¾" METAL FURRING CHANNELS @ 16" O.C. AND ⅝" G.W.B. OVER EXISTING WALL CONSTRUCTION. EXTEND FURRING AND G.W.B. TO 6" ABOVE FINISHED CEILING PLANE.	**W12**	3 ⅝" 20 GAUGE STEEL STUDS @ 16" O.C. EXTENDING TO BOTTOM OF DECK ABOVE. PROVIDE DEFLECTION TRACK AT BOTTOM OF DECK TO ALLOW FOR DEFLECTION OF DECK ABOVE. 2 LAYERS OF 5/8" G.W.B. ON ONE SIDE OF STUD, TAPED & FINISHED, AND SOUND ATTENUATION BLANKETS EXTENDING TO WITHIN 1" OF DECK ABOVE.		

GENERAL NOTES

1. COORDINATE THE WORK OF EACH TRADE WITH THE WORK OF ALL OTHER TRADES.
2. ALL DIMENSIONS ARE FROM FACE OF BLOCK OR FACE OF GYPSUM BOARD. ANY DIMENSIONS NOT SHOWN OR DEEMED QUESTIONABLE ARE TO BE VERIFIED WITH THE ARCHITECT. DO NOT SCALE FROM THE DRAWINGS.
3. REFER TO WALL TYPES SCHEDULE ON SHEETS A001 AND A007 TO DETERMINE WHICH WALLS EXTEND TO DECK. SEE STRUCTURAL FOR TOP SUPPORT DETAIL. WHERE METAL STUDS EXTEND TO DECK, PROVIDE SLIP CONNECTIONS FOR ROOF/ FLOOR DEFLECTION. STUD, STUD AND G.W.B CONNECTIONS ARE NOT CONSIDERED. ROOF OR FLOOR DECK MUST TO BE BRACED TO STRUCTURE. REFER TO STRUCTURAL. REFER TO REFLECTED CEILING PLANS FOR FIRE-RATING REQUIREMENTS OF INTERIOR PARTITIONS.
4. ALL STEEL STUDS ARE TO BE BRACED ACCORDING TO MANUFACTURER LIMIT HEIGHT(L/240).
5. WHERE INSULATED OR SOUND WALLS EXTEND TO DECK, FILL DECK FLUTES WITH INSULATION/ SOUND ATTENUATION.
6. ALL CONCRETE MASONRY UNITS (CMU) SHALL BE LAID RUNNING BOND U.N.O.
7. REFER TO PLUMBING PLANS FOR LOCATIONS OF FLOOR DRAINS.
8. WHERE ACCESS PANELS ARE SHOWN IN TOILET ROOM CHASES, FINAL LOCATION SHALL BE COORDINATED WITH OTHER TRADES PRIOR TO INSTALLATION.
9. REFER TO ARCHITECTURAL DRAWINGS FOR WALL LOUVER LOCATIONS, SIZES, AND QUANTITIES.
10. FOR CASEWORK, MILLWORK AND TOILET ACCESSORIES, SEE A700 SERIES DRAWINGS.
11. DOORS AND FRAME NUMBERS CORRESPOND TO ROOM NUMBERS. WHERE MORE THAN ONE DOOR OCCURS IN A ROOM, A SUFFIX HAS BEEN ADDED (I.E. A103A). SEE A100 SERIES DRAWINGS FOR DOOR SCHEDULE. ALL DOOR FRAMES SHALL BE 4" MIN. OFF OF FINISH WALLS U.N.O.
12. PROVIDE MISCELLANEOUS SUPPORTS FOR ALL CEILING AND WALL SUPPORTED ITEMS.
13. PROVIDE FIRE RESISTANT TREATED WOOD BLOCKING SUPPORTS IN STUD WALLS AND/OR GROUTED MASONRY CORES AS REQUIRED TO SUPPORT EQUIPMENT/PLUMBING FIXTURES, ETC.
14. ALL WORK IS TO BE COMPLETED IN STRICT ACCORDANCE WITH ALL APPLICABLE CODES, ORDINANCES, RULES, & STANDARDS, INCLUDING BUT NOT LIMITED TO THE INDIANA BUILDING CODE, THE INDIANA ACCESSIBILITY CODE, THE INDIANA PLUMBING, MECHANICAL AND ELECTRICAL CODES, THE INDIANA FIRE CODE, THE AMENDMENTS WITH DISABILITIES ACT (ADA), AND APPLICABLE TRADE STANDARDS. ALL APPLICABLE RULES & REGULATIONS ARE TO BE THE MOST CURRENT ADOPTED EDITIONS.
15. AT BUILDING EXPANSION JOINTS, ALL PARTITIONS, CEILINGS, FLOORS, AND ALL WALL, FLOOR OR CEILING MOUNTED ITEMS SHALL BE ANCHORED TO THE BUILDING STRUCTURE ON ONLY ONE SIDE OF THE EXPANSION JOINTS. CONTRACTOR SHALL COORDINATE CONSTRUCTION OR INSTALLATION OF ALL ITEMS NOTED TO ENSURE THAT NO SUCH ITEMS BRIDGE ACROSS THE EXPANSION JOINT.
16. ALL SLAB-ON-GRADE CONTROL JOINTS TO BE CLEANED & CAULKED PRIOR TO PLACEMENT OF FLOOR FINISH.
17. PAINT ALL STEEL DOORS AND FRAMES. REFER TO A800 SERIES DRAWINGS FOR PAINT COLOR.
18. ALL GLASS AT INTERIOR DOOR FRAMES, DOOR LITES & WINDOW FRAMES IS TO BE 1/4" CLEAR TEMPERED GLASS UNLESS OTHERWISE NOTED.

KEYED PLAN NOTES

A1 JANITOR'S SINK. (SEE PLUMBING DRAWINGS)
A2 BULKHEAD ABOVE (REFER TO REFLECTED CEILING PLANS).
A3 2" EXTERIOR BUILDING EXPANSION JOINT ASSEMBLY EQUAL TO "COLORSEAL" BY EMCO. EXTERIOR FACIAL OF SMART SEAL ASSEMBLY SHALL BE PRE-COLORED AS IT EXTENDS UP THE WALL FROM GROUND TO PARAPET. CONTRACTOR TO PROVIDE 2 INCH JOINT STARTER WITH INSULATION IN VOIDED BACKUP WALL.
A4 2" INTERIOR EXPANSION JOINT ASSEMBLY AT CMU WALL EQUAL TO BALCO MODEL #S WD-2 AND WCC-2.
A5 OPERABLE PARTITION WALL. MANUAL OPERATION. SEE X/A000.
A6 PRE-MANUFACTURED DISPLAY CASE. SEE DETAIL X/A000.
A7 REMOVE PORTION OF EXISTING WALL AS REQUIRED TO TOOTH IN NEW BLOCK TO MATCH EXISTING.
A8 LOCATE 3 3/4" METAL STUDS IN BETWEEN EXISTING STEEL BRACING IN ORDER TO HOLD GYPSUM BOARD FINISH FACE AS CLOSE TO BRACING AS POSSIBLE.
A9 METAL PAN STAIR CONSTRUCTION WITH PAINTED STEEL HANDRAILS/GUARDRAILS. SEE STAIR SECTIONS FOR MORE INFORMATION.
A10 2" EXPANSION JOINT ASSEMBLY AT FLOOR EQUAL TO BALCO MODEL #CX-3 AND XXX-2.
A11 CABINET UNIT HEATER - SEE MECHANICAL.
A12 HANDICAP PUSH PAD FOR AUTOMATIC DOOR OPERATION
A13 PATCH EXISTING WALL SURFACE AT LOCATION OF REMOVED CMU WALL AS REQUIRED TO MATCH EXISTING ADJACENT CONSTRUCTION TO REMAIN. REPLACE DAMAGED CMU LINES IT WILL TO REMAIN AS REQUIRED. PREPARE FOR INSTALLATION OF NEW FINISH.

KEY PLAN

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322 West Main Street
Westfield, Indiana 46074

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PROJECT:
WESTFIELD HIGH SCHOOL CLASSROOM ADDITION
18250 NORTH UNION STREET
Westfield, Indiana 46074

SCOPE DRAWINGS:
These drawings indicate the general scope of the project in terms of architectural design, concept, the complexity of the work, the quality of materials and finishes, and the size and character of the building components.
The drawings do not necessarily indicate or describe all of the work required for the complete and satisfactory performance and completion of the contract.
On the basis of the general scope indicated or described, the bidder contractor shall furnish all items required for the proper execution and completion of the work.

REVISIONS:

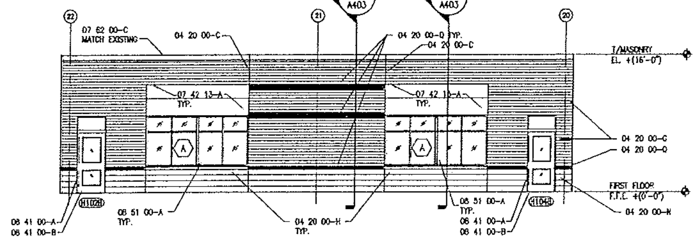
ISSUE DATE	DRAWN BY	CHECKED BY
02-05-09	LTR	JDO

DRAWING TITLE:
SECOND FLOOR PLAN UNIT 'A'

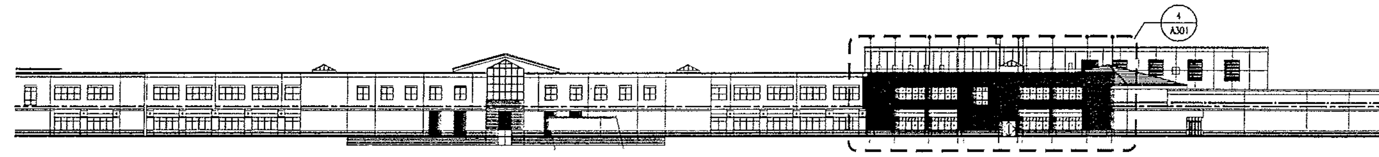
CERTIFIED BY:

DRAWING NUMBER
A202

PROJECT NUMBER
28059



6 / A301 **WALL SECTION (ALT. BID)**
SCALE: 1/32" = 1'-0"



5 / A301 **OVERALL WEST ELEVATION**
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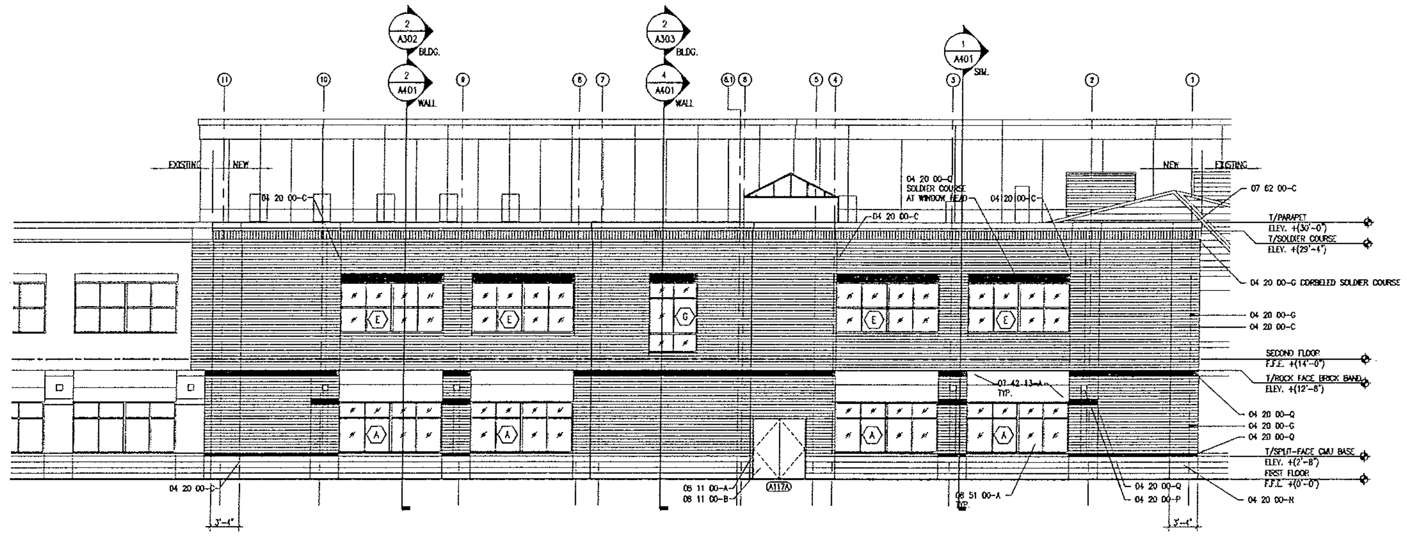
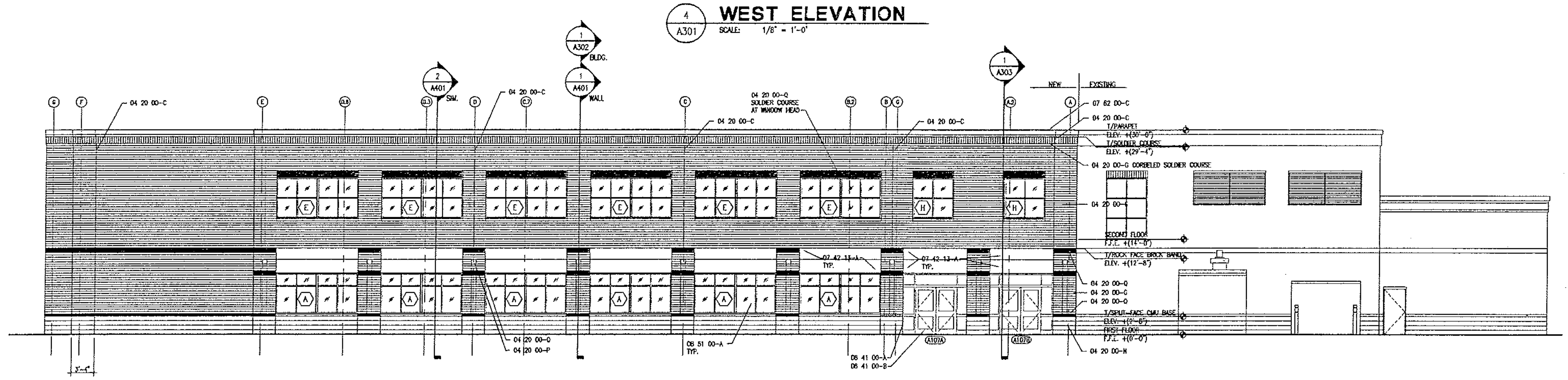
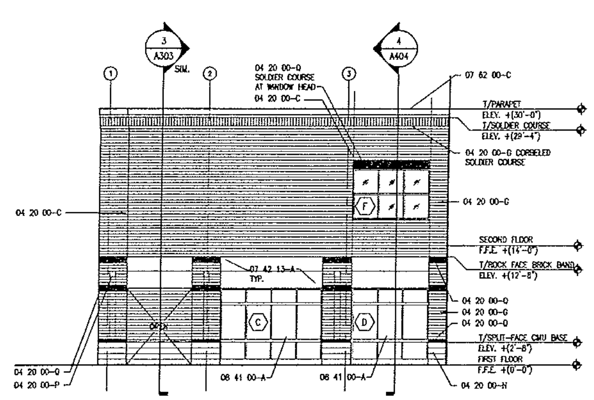


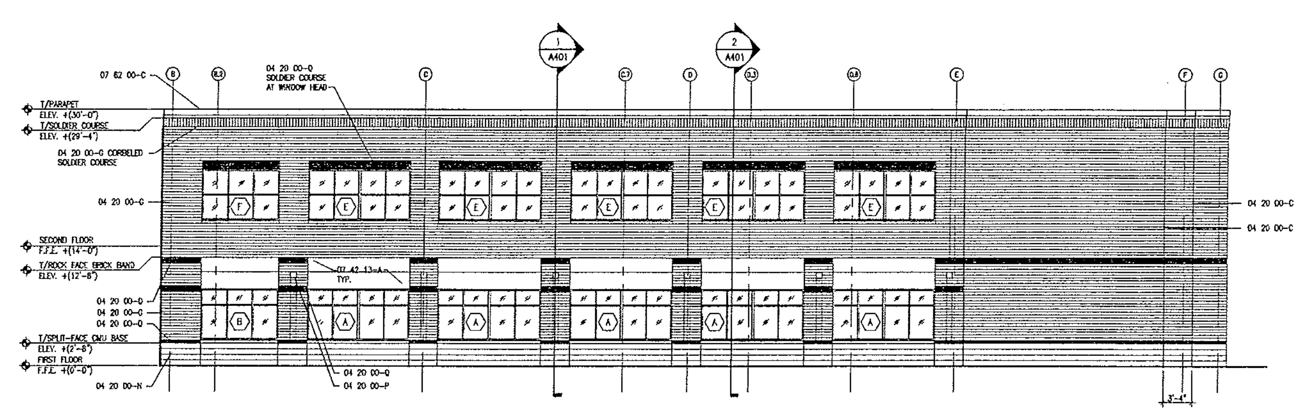
4 / A301 **WEST ELEVATION**
SCALE: 1/8" = 1'-0"



3 / A301 **SOUTH ELEVATION**
SCALE: 1/8" = 1'-0"



2 / A301 **EAST ELEVATION**
SCALE: 1/8" = 1'-0"



1 / A301 **NORTH ELEVATION**
SCALE: 1/8" = 1'-0"

KEYNOTES

DIVISION 1 - GENERAL REQUIREMENTS

THESE KEYNOTES ARE ORGANIZED BASED UPON THE CONSTRUCTION SPECIFICATIONS INSTITUTE'S MASTERFORMAT 2004 EDITION. THE ORGANIZATION OF THESE NOTES INTO DIVISIONS CONFORMS IN GENERAL WITH THE PROJECT MANUAL PREPARED FOR THIS PROJECT. REFER TO SHEET A200 FOR ASSIGNMENT OF KEYNOTES TO SPECIFICATION SECTIONS.

DIVISION 2 - SEE CIVIL DRAWINGS

02 00 00-A	FINISHED GRADE – MINIMUM 4 INCHES BELOW FINISHED FLOOR (SEE DIVISION 31)
02 00 00-B	CONCRETE STOOP/SIDEWALK (SEE DIVISION 32)

DIVISION 3 - CONCRETE

03 30 00-A	WATERSTOP
03 30 00-B	CONCRETE SLAB-ON-GRADE ON VAPOR BARRIER OVER COMPACTED GRANULAR FILL
03 30 00-C	COMPOSITE CONCRETE SLAB
03 30 00-D	CONCRETE HOUSEKEEPING PAD
03 30 00-E	CONCRETE FOOTER

DIVISION 4 - MASONRY

04 20 00-A	JOINT REINFORCEMENT AT 16" O.C. VERTICALLY
04 20 00-B	MASONRY TIE
04 20 00-C	VERTICAL MASONRY CONTROL JOINT
04 20 00-D	THROUGH-WALL FLASHING W/ WEEPHOLES
04 20 00-E	MORTAR NET
04 20 00-F	FLASHING & COUNTER FLASHING
04 20 00-G	BRICK MASONRY – BRICK TYPE 1 – FIELD BRICK
04 20 00-H	BRICK MASONRY – BRICK TYPE 2 – SPECIAL SHAPE BRICK SILL TO MATCH FIELD BRICK
04 20 00-J	CONCRETE MASONRY UNIT
04 20 00-K	CONCRETE MASONRY LINTEL
04 20 00-L	BOND BEAM MASONRY UNIT
04 20 00-M	SOLID UNIT
04 20 00-N	SPLIT-FACE CONCRETE MASONRY UNIT
04 20 00-P	GLAZED CONCRETE MASONRY ACCENT UNIT
04 20 00-Q	ROCK FACE BRICK UNITS

DIVISION 5 - METALS

05 12 00-A	STRUCTURAL STEEL FRAMING MEMBER – SEE STRUCTURAL
05 12 00-B	STEEL ANGLE – SEE STRUCTURAL
05 12 00-C	STEEL CHANNEL – SEE STRUCTURAL
05 12 00-D	STEEL PLATE – SEE STRUCTURAL
05 12 00-E	STEEL BENT PLATE – SEE STRUCTURAL
05 12 00-F	STEEL TUBE – SEE STRUCTURAL
05 12 00-G	MISCELLANEOUS STEEL
05 21 00-A	STEEL JOIST – SEE STRUCTURAL
05 31 00-A	STEEL ROOF DECKING – SEE STRUCTURAL
05 31 00-B	STEEL FLOOR DECKING – SEE STRUCTURAL
05 40 00-A	3⅝" 18 GA. STEEL STUDS AT 16" O.C., CROSS BRACING AS REQUIRED.
05 40 00-B	6" 18 GA. STEEL STUDS AT 16" O.C., CROSS BRACING AS REQUIRED.
05 40 00-C	8" 18 GA. STEEL STUDS AT 16" O.C., CROSS BRACING AS REQUIRED.
05 40 00-D	DEFLECTION TRACK
05 40 00-E	CLIP ANGLE
05 50 00-A	SHIP'S LADDER
05 51 00-A	STEEL TUBE STRINGER
05 51 00-B	PAN TREAD
05 51 00-C	GAUGE METAL RISER
05 51 00-D	STAIR NOSING
05 52 13-A	PAINTED HANDRAIL TO MATCH EXISTING

DIVISION 6 - WOOD AND PLASTICS

06 10 00-A	WOOD BLOCKING – NOMINAL 2 INCH THICKNESS
06 10 00-B	WOOD BLOCKING – NOMINAL 1 INCH THICKNESS
06 10 00-C	½" EXTERIOR GRADE PLYWOOD
06 10 00-D	⅝" EXTERIOR GRADE PLYWOOD
06 10 00-E	¾" EXTERIOR GRADE PLYWOOD
06 16 43-A	⅝" EXTERIOR GYPSUM SHEATHING
06 40 00-A	ARCHITECTURAL MILLWORK
06 40 00-B	PLASTIC LAMINATE COUNTERTOP
06 40 00-C	PLASTIC LAMINATE WINDOW STOOL

DIVISION 7 - THERMAL AND MOISTURE PROTECTION

07 21 00-A	2" PERIMETER BOARD INSULATION, EXTENDING HORIZONTALLY MINIMUM 48 INCHES
07 21 00-B	2" CAVITY WALL EXTRUDED BOARD INSULATION
07 21 00-C	1½" EXTRUDED BOARD INSULATION
07 21 00-D	BATT INSULATION
07 21 00-E	NOT USED
07 21 00-F	MINERAL WOOL
07 21 00-G	FOAMED-IN-PLACE INSULATION
07 24 13-A	DIRECT APPLY UNINSULATED SOFFIT SYSTEM OVER 5/8" EXTERIOR GYPSUM SHEATHING (06 16 43-A)
07 27 29-A	AIR AND VAPOR INFILTRATION BARRIER
07 42 13-A	COMPOSITE METAL WALL PANEL – COLOR TO MATCH EXISTING
07 42 13-B	MISCELLANEOUS METAL TRIM PIECES
07 42 13-C	2" ZEE CHANNELS
07 53 23-A	FULLY ADHERED EPDM MEMBRANE ROOFING SYSTEM
07 53 23-B	ROOF INSULATION, MIN. THICKNESS =3"
07 53 23-C	TAPERED ROOF INSULATION
07 53 23-D	INSULATION CRICKET
07 53 23-E	TERMINATION BAR AND COUNTER FLASHING
07 62 00-A	SHEET METAL FLASHING
07 62 00-B	SHEET METAL TRIM
07 62 00-C	SHEET METAL COPING
07 62 00-D	SHEET METAL GRAVEL STOP
07 62 00-E	SHEET METAL FASCIA
07 62 00-F	SHEET METAL GUTTER
07 62 00-G	SHEET METAL DOWNSPOUT – 3" x 5"
07 62 00-H	SHEET METAL SOFFIT
07 71 29-A	ROOF EXPANSION JOINT ASSEMBLY – 2 INCH
07 84 20-A	FIRE RESISTIVE JOINT SYSTEM
07 92 00-A	BACKER ROD AND SEALANT
07 92 00-B	SEALANT
07 92 00-C	2 INCH WIDE EXTERIOR EXPANSION JOINT ASSEMBLY
07 95 13-A	INTERIOR FLOOR EXPANSION JOINT ASSEMBLY
07 95 13-B	INTERIOR WALL EXPANSION JOINT ASSEMBLY
07 95 13-C	INTERIOR CEILING EXPANSION JOINT ASSEMBLY
07 95 13-D	INTERIOR FLOOR TO WALL EXPANSION JOINT ASSEMBLY
07 95 13-E	INTERIOR WALL EXPANSION JOINT ASSEMBLY; INSIDE CORNER
07 95 13-F	INTERIOR CEILING TO WALL EXPANSION JOINT ASSEMBLY
07 95 13-G	EXTERIOR ROOF EXPANSION JOINT ASSEMBLY

DIVISION 8 - DOORS AND WINDOWS

08 11 00-A	HOLLOW METAL DOOR FRAME
08 11 00-B	HOLLOW METAL DOOR
08 14 00-A	FLUSH WOOD DOOR
08 41 00-A	ALUMINUM-FRAMED ENTRANCES & STOREFRONT – 4 1/2" DEEP SYSTEM
08 41 00-B	ALUMINUM WIDE STYLE DOOR
08 41 00-C	ALUMINUM CLOSURE PIECE
08 51 00-A	ALUMINUM WINDOW
08 51 00-B	ALUMINUM EXTERIOR WINDOW SILL
08 80 00-A	¼" CLEAR TEMPERED GLASS
08 80 00-B	1" INSULATED GLASS – TINTED AND TEMPERED WITH LOW E COATING
08 90 00-A	FIXED LOUVER WITH BIRD SCREEN

DIVISION 9 - FINISHES

09 21 00-A	⅝" TYPE X GYPSUM BOARD
09 21 00-B	⅝" MILDEW-RESISTANT GYPSUM WALLBOARD
09 21 00-C	⅝" ABUSE-RESISTANT GYPSUM WALLBOARD
09 21 00-D	⅝" TILE BACKING BOARDS
09 21 00-E	WALLBOARD CONTROL JOINT
09 21 00-F	1⅝" 20 GA. STEEL STUD
09 21 00-G	2½ 20 GA. STEEL STUD
09 21 00-H	3⅝" 20 GA. STEEL STUD
09 21 00-J	6" 20 GA. STEEL STUD
09 21 00-K	DEFLECTION TRACK
09 21 00-L	Z FURRING CHANNEL
09 21 00-M	⅞" FURRING CHANNEL
09 21 00-N	1½" FURRING CHANNEL
09 21 00-P	METAL SUSPENDED CEILING AND SOFFIT FRAMING SYSTEM
09 21 00-Q	5/8" HI-IMPACT GYPSUM WALLBOARD
09 21 00-R	SOUND ATTENUATION BLANKETS
09 50 00-A	GYPSUM CEILING PANEL
09 50 00-B	ACOUSTICAL CEILING SUSPENSION ASSEMBLY
09 50 00-C	ACOUSTICAL CEILING EXTRUDED ALUMINUM PERIMETER EDGE TRIM – 6" HIGH
09 65 00-A	RESILIENT BASE
09 65 00-B	RESILIENT FLOOR TILE
09 65 00-C	RESILIENT STAIR TREADS AND RISERS
09 97 00-A	HIGH PERFORMANCE COATING – ALIPHATIC POLYURETHANE

DIVISION 10 - SPECIALTIES

10 11 00-A	VISUAL DISPLAY SURFACE
10 12 00-A	MANUFACTURED DISPLAY CASE UNIT
10 22 00-A	OPERABLE PANEL PARTITION
10 51 00-A	LOCKER

DIVISION 11 - EQUIPMENT

11 52 00-A	CEILING MOUNTED PROJECTION SCREEN

DIVISION 12 - FURNISHINGS

12 32 00-A	INSTITUTIONAL CASEWORK

DIVISION 13 - SPECIAL CONSTRUCTION

NOT USED

DIVISION 14 - CONVEYING SYSTEMS

NOT USED

DIVISION 15 - PLUMBING

15 00 00-A	ROOF DRAIN
15 00 00-B	PLUMBING FIXTURE – SEE PLUMBING SHEETS

WESTFIELD WASHINGTON SCHOOL CORPORATION

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PROJECT:
WESTFIELD HIGH SCHOOL CLASSROOM ADDITION
18250 NORTH UNION STREET
Westfield, Indiana 46074

SCOPE DRAWINGS:

These drawings indicate the general scope of the project in terms of architectural design concept, the dimensions of the building, the major architectural elements and the type of structural, mechanical and electrical systems.

The drawings do not necessarily indicate or describe all work required for full performance and completion of the requirements of the Contract.

On the basis of the general scope indicated or described, the trade contractors shall furnish all items required for the proper execution and completion of the work.

REVISIONS:

ISSUE DATE	DRAWN BY	CHECKED BY
02-05-09	LTR	JDO

DRAWING TITLE:
EXTERIOR BUILDING ELEVATIONS

CERTIFIED BY:

DRAWING NUMBER
A301

PROJECT NUMBER
28059