Drain: SAIL PLACE ORAIN Drain #: 298

Improvement/Arm: SAIL PLACE - FAIL CREEK HARBOUR - SECTION 1

Operator: SCM/ JOH Date: 4-27-04

Drain Classification: Urbap/Rural Year Installed: 1998

GIS Drain Input Checklist

| • | Pull Source Documents for Scanning | Scm/gg |
|---|---|--------|
| • | Digitize & Attribute Tile Drains | NA |
| • | Digitize & Attribute Storm Drains | simple |
| • | Digitize & Attribute SSD | NA |
| • | Digitize & Attribute Open Ditch | Ma |
| • | Stamp Plans | sim pa |
| • | Sum drain lengths & Validate | ga . |
| • | Enter Improvements into Posse | Jeg |
| • | Enter Drain Age into Posse | Just |
| • | Sum drain length for Watershed in Posse | port |
| • | Check Database entries for errors | and of |

Gasb 34 Footages for Historical Cost <u>Drain Length Log</u>

Drain-Improvement: SAIL PLACE ORAIN-SAIL PLACE-FAIL CREEK HARBON - SECTION 4

| Drain Type: | Size: | Length SURVEYIES REGIO | Length (DB Query) | Length Reconcile | Price: | Cost: |
|--------------|-------|------------------------------|----------------------|---------------------|---------------------------------------|-------|
| RCP | 124 | 40' | 40' | Ø | | |
| | 15" | 72' | 221 | Ø | | |
| | 24" | 140' | 140' | Ø | | |
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Kenton C. Ward, Surveyor Phone (317) 776-8495

Fax (317) 776-9628

Suite 146 One Hamilton County Square Noblesville, Indiana 46060-2230

August 7, 1998

TO: HAMILTON COUNTY DRAINAGE BOARD

RE: Sail Place Drain, Fall Creek Harbour Arms

Attached is a petition and plans for the extension of the Sail Place Drain filed by Mattingley Corporation for Fall Creek Harbour. The proposed extensions are both which carry drainage from the North side of Fall Creek Road, South into the Sail Place drain system.

The West arm is located approximately 360 feet West of the Center/line of Brooks School Road. The pipe shall be seventy-two (72') feet of 24" RCP, which will connect to Sail Place structure number 708. The North end of the pipe is located in the North R/W of Fall Creek Road and is listed as structure number 7 on the Fall Creek Harbour Development Plan.

The East arm is located approximately fifty (50') feet West of the centerline of Brooks School Road. The pipe shall be sixty-five (65') of 24" RCP under Fall Creek Road, which enters the manhole on the South side of the road. This manhole is structuring number 711 on the Sail Place Development plan. The section of pipe between Structures 1 and 2 on the Fall Creek Harbour Development Plan (21 feet of 15""RCP) is also included, as is the section of pipe between structures 1 and 3 on the plan

(40 feet of 12" RCP). The total length of the extension is 198 feet.

All of the proposed extension is located in the R/W's for Fall Creek Road and Brooks School Road. Therefore, easements on the Fall Creek Harbour are not required.

The assessments for Sail Place have been set at \$50.00 per lot with a minimum of \$50.00 and \$5.00 per acre for roads. Because this is a commercial site which, due to the increased area of roof and paved parking, I recommend the Commercial assessment rate be set at \$50.00 per acre, with a minimum of \$50.00.

I recommend that a hearing for this proposal be set for September 1998.

Kenton C. Ward

Hamilton County Surveyor

KCW/neo

FINDINGS AND ORDER

CONCERNING THE MAINTENANCE OF THE

Sail Place Drain, Fall Creek Harbour Arm

On this 28th day of September, 1998, the Hamilton County Drainage Board has held a hearing on the Maintenance Report and Schedule of Assessments of the Sail Place Drain, Fall Creek Harbour Arm.

Evidence has been heard. Objections were presented and considered. The Board then adopted the original/amended Schedule of Assessments. The Board now finds that the annual maintenance assessment will be less than the benefits to the landowners and issues this order declaring that this Maintenance Fund be established.

HAMILTON COUNTY DRAINAGE BOARD

Alaskar Class

President

Member

Attest: Limbaly Wallace

CERTIFICATE OF COMPLETION AND COMPLIANCE

To: Hamilton County Surveyor's Office

From: Mid-States Engineering, LLC

Subject: Fall Creek Harbour Section 1 - Storm Sewer As-Builts

I hereby certify that:

- 1) I am familiar with the plans and specifications for the above-referenced project;
- 2) I have personally observed the completion of the above-referenced project; and
- 3) To the best of my knowledge, information and belief, the above-referenced project has been performed and completed in conformity with all plans and specifications, except as noted on Record Drawings' as submitted.

Signature Date: 1/04/01

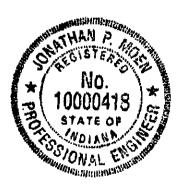
Typed or Printed Name: Jonathan P. Moen

Business Address: 350 E. New York Street, Suite 300

Indianapolis, IN 46204

Telephone: 317-634-6434

Seal



Professional Registration No. 10000418



Kenton C. Ward, Surveyor Phone (317) 776-8495 Fax (317) 776-9628

Suite 188 One Hamilton County Square Noblesville, Indiana 46060-2230

To: Hamilton County Drainage Board

September 30, 2002

Re: Sail Place Drain: Fall Creek Harbour Arm

Attached are as-builts, certificate of completion & compliance, and other information for Fall Creek Harbour Arm. An inspection of the drainage facilities for this section has been made and the facilities were found to be complete and acceptable.

During construction, changes were made to the drain, which will alter the plans submitted with my report for this drain-dated August 7, 1998. The report was approved by the Board at the hearing held September 28, 1998. (See Drainage Board Minutes Book 4, Pages589-590) The changes are as follows:

STR 1-2 length of 15" RCP was increased from 21 feet to 22 feet.

STR 1-711 length of 24" RCP was increased from 65 feet to 68 feet.

The length of the drain due to the changes described above is now 202 feet.

The non-enforcement for this project was not need because all structures were placed within existing right of way.

The bond or letter of credit from Ohio Causualty, number 34688367 & 34688377; dated July 24, 1998; in the amount of \$2500 each; was released August 10, 1998.

I recommend the Board approve the drain's construction as complete and acceptable.

Sincerely,

Kenton C. Ward,

Hamilton County Surveyor

KCW/slm

| | INDEX |
|-------|---|
| 1 | TITLE SHEET |
| 2 | SPECIFICATIONS |
| 3 | DEMOLITION PLAN |
| 4 | SITE DEVELOPMENT PLAN |
| 5 | EROSION CONTROL PLAN |
| 6 | SANITARY SEWER PLAN AND PROFILES |
| 7–8 | STORM SEWER PLAN AND PROFILES |
| 9–10 | ENTRANCE PLANS |
| 11-12 | CONSTRUCTION DETAILS |
| 13–14 | SANITARY SEWER DETAILS AND SPECIFICATIONS |

| REVISIONS | | | |
|------------------------------|---|--|--|
| DATE | DATE SHEET DESCRIPTION | | |
| · 3–10–98 | 3,4,6-11 | Per Owner. | |
| 4 -3-9 8 | 1, 3–11 | Per TAC Comments | |
| 4-29-98 | 29-98 4,9-11 Per Hamilton County Highway Comments | | |
| 5-27-98 | 3,4,6,7,9,10 | Per HSE, drafting check | |
| 6-10-98 | 4,6 | Revised F.F. and T.C. elevations | |
| 7-10-98 | 4,6,7,8 | Per Client | |
| 7-13-98 | 4,6 | Per Architect | |
| 8-17-98 8-20-98 9-1-98 | 4 | Per I.W.C. | |
| 10-8-48 | 9 | Per 1. W.C. Per Humilton County Highway Dept. Added storm structures, curb cut | |
| 11-10-98 | 4,5,9,10 | Added storm structures, curb cut | |
| | | | |

LAND DESCRIPTION

Lot #9, 10, 11, 12, 13, and 16 in Lake-View Addition, (as per plat of said addition, recorded in Deed Record 130, page 612), a 3 acre tract of real estate described in Deed Record 160, page 166, and that part of the Northwest Quarter of Section 10, Township 17 North, Range 5 East, described in Deed Record 131, page 296 adjacent to said Lot #11, 12, 13, and 16, being described as follows:

Beginning at a railroad spike at the Southeast corner of the Northwest Ouarter of Section 10, Township 17 North, Range 5 East; thence North 00°31'23" East 476.70 feet on and along the East line of said Northwest Quarter to a mag nail: thence South 89°26'51" West 400.00 feet parallel with the South line of said Northwest Quarter to a 5/8" iron rod with P.I. Cripe cap: thence South 00°31'23" West 326.70 feet parallel with the East line of said Northwest Quarter to a 5/8" iron rod with P.I. Cripe cap on the North line of Lake-View Addition; thence South 89°26'51" West 295.99 feet to a5%" iron rod with yellow cap stamped S0083 at the Northwest corner of Lot #9 in said Lake-View Addition, said Northwest corner being North 89°26'51" East 640.00 feet from the West line of the East Half of said Northwest Quarter; thence South 00°32'24" West 150.00 feet to the point of intersection of the West line of said Lot #9 and the South line of said Northwest Quarter, said point of intersection being North 89°26'51" East 640.00 feet from the Southwest corner of the East Half of said Northwest Quarter: thence North 89°26'51" East 380.00 feet on and along the South line of said Northwest Quarter to the point of intersection of the South line of said Northwest Quarter and the East line of Lot #13 in said Lake-View Addition extended Southerly: thence North 00°32'24" East 150.00 feet to a⁵/8" iron rod with yellow cap stamped S0083 at the Northeast corner of said Lot #13; thence North 89°26'51" East 160.00 feet to a 5/8" iron rod with yellow cap stamped S0083 at the Northwest corner of Lot #16 in said Lake-View Addition: thence South 00°32'24" West 150.00 Peet on and along the West line of said Lot #16 and said West line extended Southerly to the South line of said Northwest Quarter: thence North 89°26′51" East 156.03 feet to the point of beginning. Containing 4.84 acres, more or less and being subject to all applicable easements and rights-of-way of record.

TOGETHER WITH:

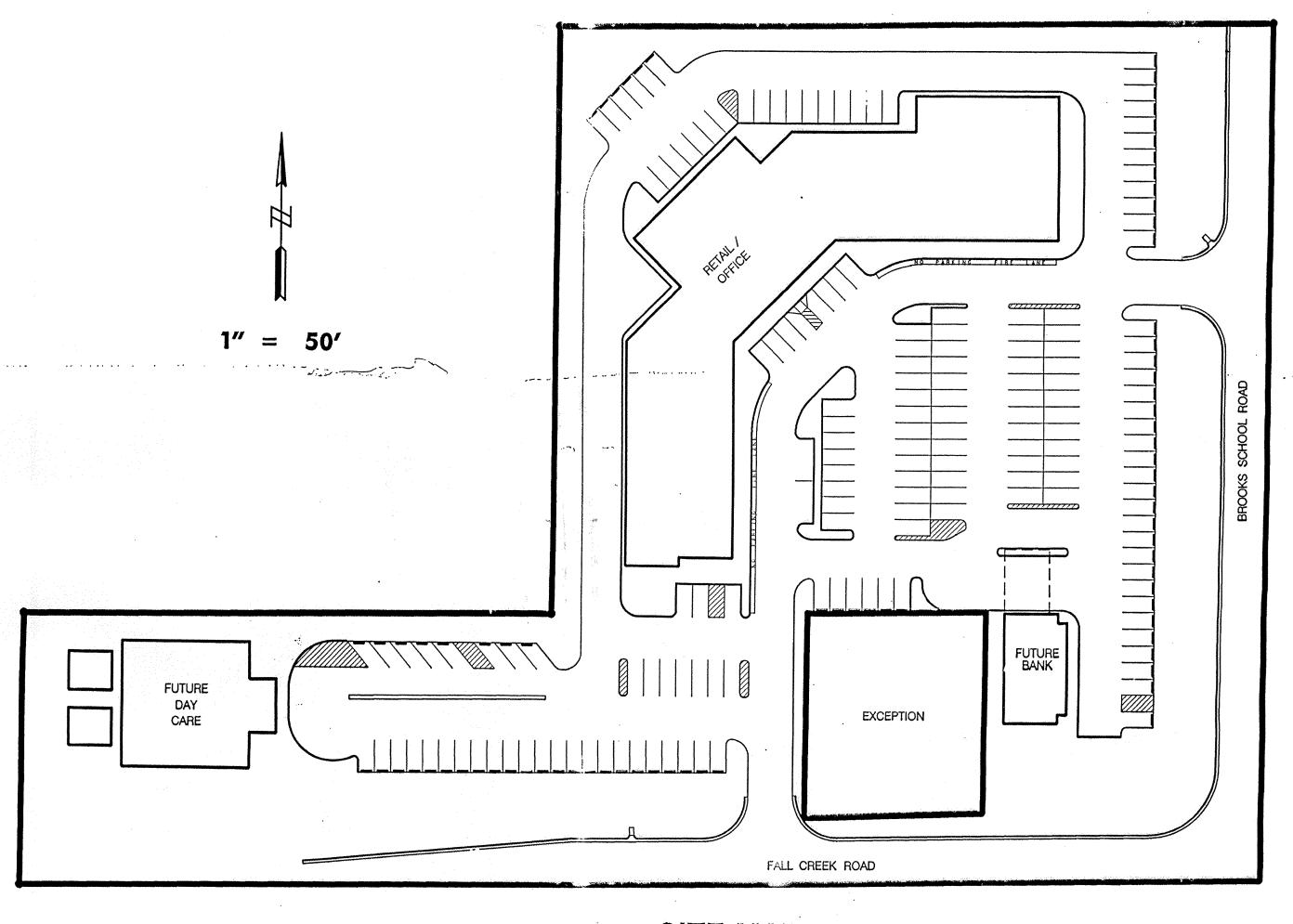
Lot numbered 14 in Lake-View Addition, an addition in Hamilton County, Indiana, located in part of the East Half of the Northwest Ouarter of Section 10, Township 17 North, Range 5 East as per plat thereof recorded in Deed Record 130, page 612 in the office of the Recorder of Hamilton County, Indiana.

ALSO:

Beginning at the Southwest corner of Lot numbered 14 in said Lake-View Addition, running thence South 35.79 feet, thence East 160 feet, thence North 38.54 feet to the Southeast corner of Lot number 15 in said Lake-View Addition, thence West 160.17 feet, along the South line of Lots 15 and 14 in said Lake-View Addition to the Place of Beginning,

A3-BUILT CONSTRUCTION DRAWINGS FOR FALL CREEK HARBOUR

SECTION 10, TOWNSHIP 17 NORTH, RANGE 5 EAST FALL CREEK TOWNSHIP HAMILTON COUNTY, INDIANA

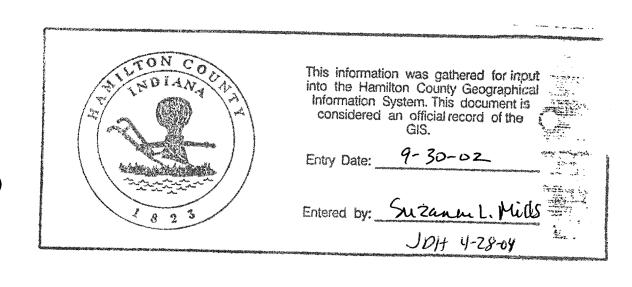


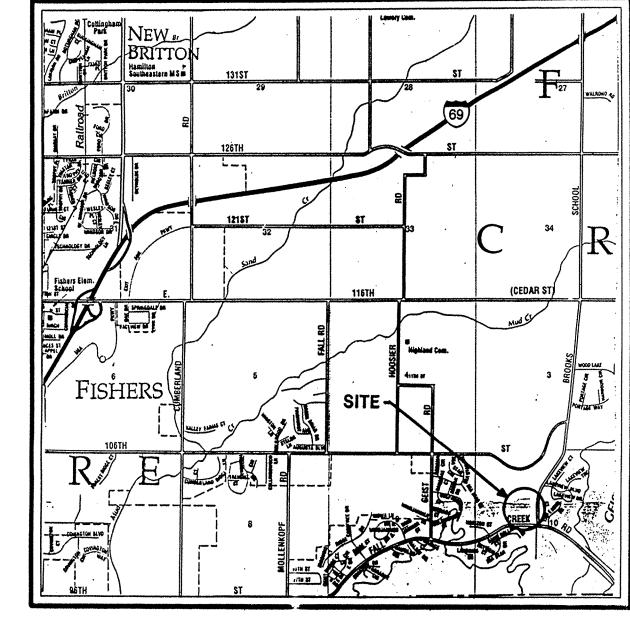
SITE MAP

AS-BUILT INFORMATION STORM SEWERS

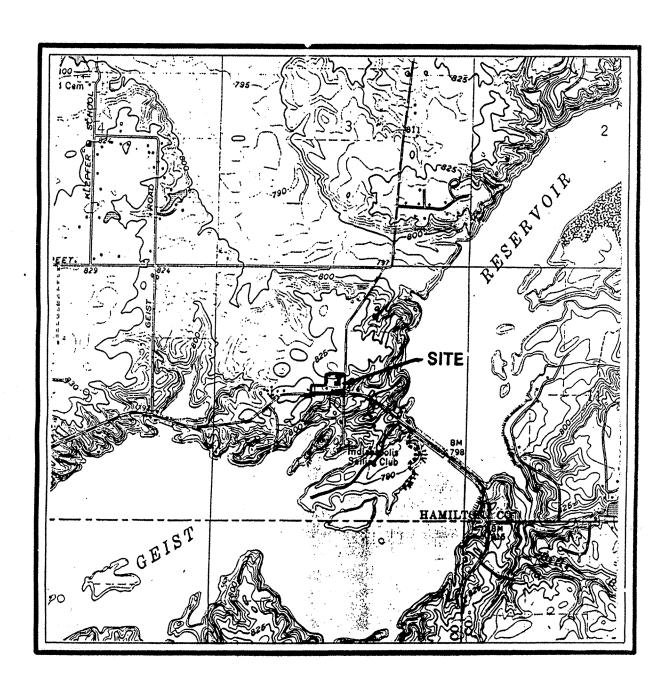
PLANS PREPARED FOR

PARAMOUNT REALTY GROUP.
5987 E. 71ST STREET, SUITE 106
INDIANAPOLIS, INDIANA 46220
CONTACT: STEVE SHEA
317-579-6926

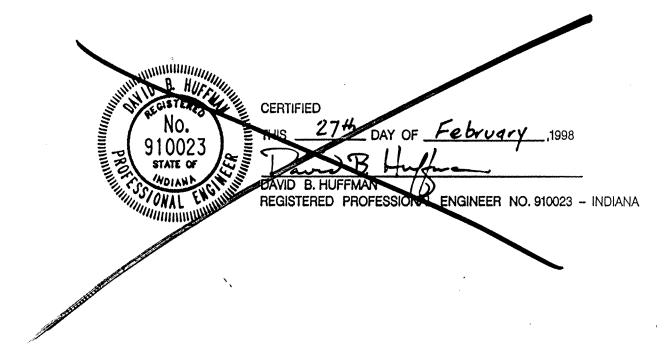




AREA MAP



VICINITY MAP





MSE Corporation

941 North Meridian Street Indianapolis, IN 46204-1061 317 634-1000 317 634-3576 FAX www.msecorp.com

121-4725 JOB NO.111-0980-

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OFFICE OF HAMILTON COUNTY SURVEYOR

0980TI.DGN

SHEET 1 OF 14

SITE WORK GENERAL NOTES AND SPECIFICATIONS

. GENERAL CONDITIONS

- A: 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.
- B. It shall be the Contractor's responsibility to determine the exact location of all existing utilities in the vicinity of the construction area prior to starting construction.
- C. It shall be the Contractor's responsibility for notification and coordination of all construction with the respective utility companies.
- D. 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. It is required that the Contractor have a qualified Superintendent on the job site at all times during construction.
- E. 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 Town that construction was done in compliance with these plans and specifications.
- F. The designation A.S.T.M. shall refer to the American Society of Testing and Materials standards. The latest revision of listed A.S.T.M. standards shall prevail.
- G. The designation IN. D. O. T. shall refer to the Indiana Department of Transportation Standard Specifications dated 1993 and all subsequent revisions.

II. CLEARING AND GRUBBING

المراجاتين يروي فالموامر فيادا فافتوام الداران يواني فيتيع فلاستعامية فالأناء المصاب يتموما استعاميت فالسعام فللساف

الرواء ما والمرافرة والأخراء والرواي فيروعنا ويعرفها العامس والمساسيعين كالمستسطينية والوار

- A. Clearing and grubbing shall consist of cutting, removal and satisfactory disposal of all trees, down timber, brush, projecting roots, stumps, rubbish, boulders, broken concrete, fencing (as designated), and other material on the project site and within the boundary as shown on the Construction Documents and/or as designated by "construction limits".
- B. Special care shall be taken to insure that trees to be left remaining in the project area shall not receive limb, bark or root injuries. When such injuries occur, all rough edges of scarred areas shall be removed in accordance with accepted horticultural practice and the scars coated thoroughly with an asphaltum base tree paint.
- C. All "unsuitable material" from clearing operations stated in Item II-A shall be removed to disposal area(s) off of the project site; unless a "Bury Pit" shall be utilized in an area and shall not be located in an area where storm drainage structures shall be located or where impoundment of surface drainage may occur. Written permission of project owner must be obtained for bury pit construction on site, including location.
- D. Materials shall not be disposed of by burning unless approved by the local Fire Marshal.

III. TREE REMOVAL AND PROTECTION

- A. Trees shall be removed from the project site only where the area is to be occupied by road and surfaced areas.
- B. Trees shall be removed from the project site as directed by the Owner, and so designated.
- C. Trees may be removed from the project site where they interfere with the placement of storm or sanitary sewers. contractor shall coordinate all tree removal with owner.
- D. The Contractor shall endeavor to save and protect trees of value and worth which do not impair construction of improvements as designated. In the event cut or fill exceeds 0.5 foot over the root area, the Owner shall be consulted with respect to protective measures to be taken, if any, to preserve such trees.
- E. The Contractor shall be responsible for determining the method for protection of tops, trunks and roots of existing trees on the project site that are to remain. Existing trees subject to construction damage shall be boxed, fenced or otherwise protected before any adjacent work is started. Earth or material and equipment shall not be stockpiled or stored within the spread of branches. Branches which need to be removed or are broken shall be neatly trimmed and scars shall be covered with tree paint.

IV. STRIPPING OF TOPSOIL

- A. The Contractor shall verify that all topsoil has been removed in the areas to be occupied by road and walks. Topsoil shall be removed to a typical depth of 6 inches to remove vegetative matter where required. The subsurface investigation indicated topsoil up to 2 feet in isolated areas. Consult the geotechnical report for specific information.
- B. Topsoil shall be kept separated from suitable fill materials and shall not be used as fill under pavement and/or building areas.
- C. Topsoil shall be stored at a location where it does not interfere with construction operations. Excess topsoil shall be removed from the site. Topsoil storage areas shall be approved in writing by the Owner.
- Topsoil shall be reasonably free from sub-soil debris and stones.

V. GRADING

- A. The Contractor shall perform all grading operations to bring sub-grades, after final compaction, to the required grades and sections for site improvement.
- B. Subgrade shall be proofrolled with suitable equipment and all spongy and otherwise unsuitable material shall be removed and replaced with suitable material.
- C. Subgrade for pariing lot shall be prepared to INDOT specifications.
 Subgrade shall be compacted to 95% of standard proctor in the upper 6" of depth. Depths of embankment below the upper 6" shall be compacted to 93% of standard proctor.
- D. All fill material shall be formed from soil free of deleterious material. Prior to placement of fill, a sample of the proposed fill material should be submitted to the soils engineer for his approval. The fill material should be placed in layers not to exceed eight (8") inches in loose thickness and should be spread and dried to a moisture content which will permit proper compaction.
- E. All fill material in areas outside of building and pavement areas shall be compacted lightly and protected from erosion. Areas of building construction shall not have unsuitable material placed in that location, and fill shall be compacted in accordance with the Soils Engineer's report (minimum of 95% standard proctor). These areas shall be determined by the developer's representative.
- VI. SANITARY SEWER CONSTRUCTION

 See sheet 13 and 14 for Hamilton Southeastern Utility details and specifications.

VII. EROSION PROTECTION DURING CONSTRUCTION

- A. The Contractor shall provide adequate erosion protection measures during construction. See sheet 5 for recommended erosion control measures.
- B. Construction operations conducted within public right-of-way shall be neatly finished graded and mulch seeded.

VIII. STORM SEWER CONSTRUCTION

- A. Storm sewer construction shall comply with requirements of the Hamilton County Surveyor, the Hamilton County Highway Department and the Hamilton county Surveyor and the Town of Fishers.
- B. All storm sever construction inside public right-of-way, either existing or to be dedicated, shall be in accordance with the Town of Fishers, and the Hamilton County Highway Department. Contractor shall notify the Town of Fishers, and the Hamilton County Highway Department 48 hours prior to commencement of storm sewer construction within public right-of-way.
- C. Where reinforced concrete pipe is shown on the construction plans, it shall be in accordance with A.S.T.M. C-76 Class III, IV or V with a minimum "B" wall thickness unless otherwise specified on the plans.

- Concrete pipe shall be furnished with a bell or groove on one end of a unit pipe, and a spigot or tongue on the adjacent end of the adjoining pipe. All joints have a groove on the spigot for placement of a rubber gasket in conformance with ASTM C 443. The gasket shall be a continous ring which fits snugly into the annular space between the overlapping surfaces of the assembled pipe joint to form of flexible soil tight seal. As an alternative, mostic joints installed in conformance with Manufacturer's recommendations will be accepted outside of the public right-of-way. however, mastic concrete pipe couplings shall be wropped with a 1' wide strip of non-woven geotextile fabric around the entire pipe diameter.
- E. Precast Manholes, catchbasins, and inlets shall be in accordance with the general ordinance.
- F. Precast concrete and stee! for manholes and inlets shall be in accordance with A.S.T.M. C-478, latest revision.
- G. Castings shall be as shown on the plan & profile sheets.
- H. Granular backfill shall be required for all crossings under pavement areas, and within 5 feet from the edge of pavement, curb, gutter, sidewalk or similar structure.
- I. Each length of reinforced concrete pipe must be marked with the following information: date of manufacture; class of pipes and specification; designation; size of pipe; trade name or the manufacture; and plant identification.

IX. UTILITIES

A. Water line

- See sheets 14 and 15 for vertical and horizontal separations between sanitary sewer.
- 2. All water lines shall be in accordance with the Standards and Specifications of the Indiana Department of Environmental Management. Sterilization of water mains shall be in accordance with the I.D.E.M. for procedures and time of treatment.
- Pressure tests for the water system shall be done in accordance with manufacturer's recommendations.
- 4. Granular backfill shall be required for all utility crossings under perement areas and 5 feet beyond the edge of pavement, sidewalk curbs, gutters, or similar structures.
- 5. All water lines within the existing or proposed right-of-way or special easements requested by Indianapoils Water Company shall be PVC or PE and shall be installed in accordance with the Indianapolis Water Company Specifications.
- 6. Where private water lines for potable water lines are shown on the contract plans, they shall be type "C" copper pipe for sizes up to 2 1/2". Copper water service lines and fittings shall conform to A.S.T.M. B-88.
- 7. Thrust blocks shall be installed in accordance with the details contained within the plans, or the indianapolis Water Company standard specifications, as applicable.
- 8. Felt material not to exceld % inch thick shall be placed between piles and concrete thrust blocks.
- 9. All valves and appurtenances for domestic and fire protection water mains shall be approved by the Underwriters Laboratories and Factory Mutual for crirical use.
- 10. Refer to separate water line plans for this section for more detailed water line pipe sizes, materials, hydrant and valve locations. Water lines shown on these plans are for coordination purposes only.

B. Electric and Telephone

- 4" pvc conduit shall be required for all crossings under pavement areas.
- Granular backfill shall be required for all crossings under pavement areas.
- 3. Concrete pads for electric and telephone transformers shall be set at the approximate ground grade as shown on the Site Development Plan for the respective. locations.

X. GRANULAR BACKFILL

Shall be in accordance with IN.D.O.T. Standard Specifications.

XI. PAVEMENT CONSTRUCTION

- A. Subgrade shall be prepared in compliance with Section 207.02 of the IN.D.O.T. standard specifications. No traffic shall be permitted on the prepared subgrade pr or to paving.
- B. Contractor shall notify the Town of Fishers
 48 hours prior to commencement of construction
 within the proposed right-of-way of Brooks
 School Road. Notify the Hamilton County Highway
 Department 48 hours prior to construction within
 the right-of-way of Fall Creek Road.

XII. CONCRETE CURB AND WALKS

- A. See Detail Sheets for type and details. Curbs and walks within existing or proposed right-of-way shall be constructed in accordance with the Town of Fishers and the Hamilton County Highway Department.
- B. Concrete shall be ready mixed Portland cement conforming to A.S.T.M. C-150, and water.
 Aggregate shall conform to A.S.T.M. C-33.
 Compressive strength of concrete at 28 days shall be 4000 p.s.i. Where required, reinforcement shall be welded steel wire fabric conforming to A.S.T.M. A-185.

C. Application

- 1. Place concrete only on a moist, compacted subgrade or base free from loose material. Place no concrete on muddy or frozen subgrade.
- 2. Concrete shall be deposited so as to require as little rehandling as practical. When concrete is to be placed at an atmospheric temperature of 35°F. or less, Paragraph 702.10 of the IN.D.O.T. Specifications, 1993 edition, shall apply.
- 3. Except as otherwise specified, cure all concrete by one of the methods described in Section 501.17 of the IN.D.O.T. Specifications, 1993 edition.

XIII. FINISH GRADING AND SODDING (Owner shall designate location if required.)

- A. Over the approved rough grade (see Section V), spread 4" minimum of topsoil or approved fill to such depth as will finish to the required finish grades and contours after rolling and natural settlement. New grades shall slope uniformly between levels established on the plans, and intersections of new grades with existing grades shall be uniform and smooth.
- B. Contractor shall have soil PH tested by independent soil testing laboratory as directed by owner. topsoil shall be adjusted to a PH range of 6.0 to 7.0 a fertilizer mixture with a N-P-K raito of 1-2-2 shall be applied at a rata of 2 pounds phosphorus (P) per 1000 square feet to a depth of 3 inches.
- C. Areas where stripping, cuts, or fills have been graded and where additional work is not scheduled for a period of 2 months to a year shall be temporarily seeded as shown in the seasonal soil protection chart in the construction details.
- D. In areas of permanent seeding behind curbs, the areas shall be constantly damp (DO NOT OVERWATER) with full soakings as required for a healthy thick stand of grass to be established.

NOT PART OF AS-BUILT SURVEY

| | REVISIONS AND DATES | Designed by: |
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street Indianapolis, IN 46204-1

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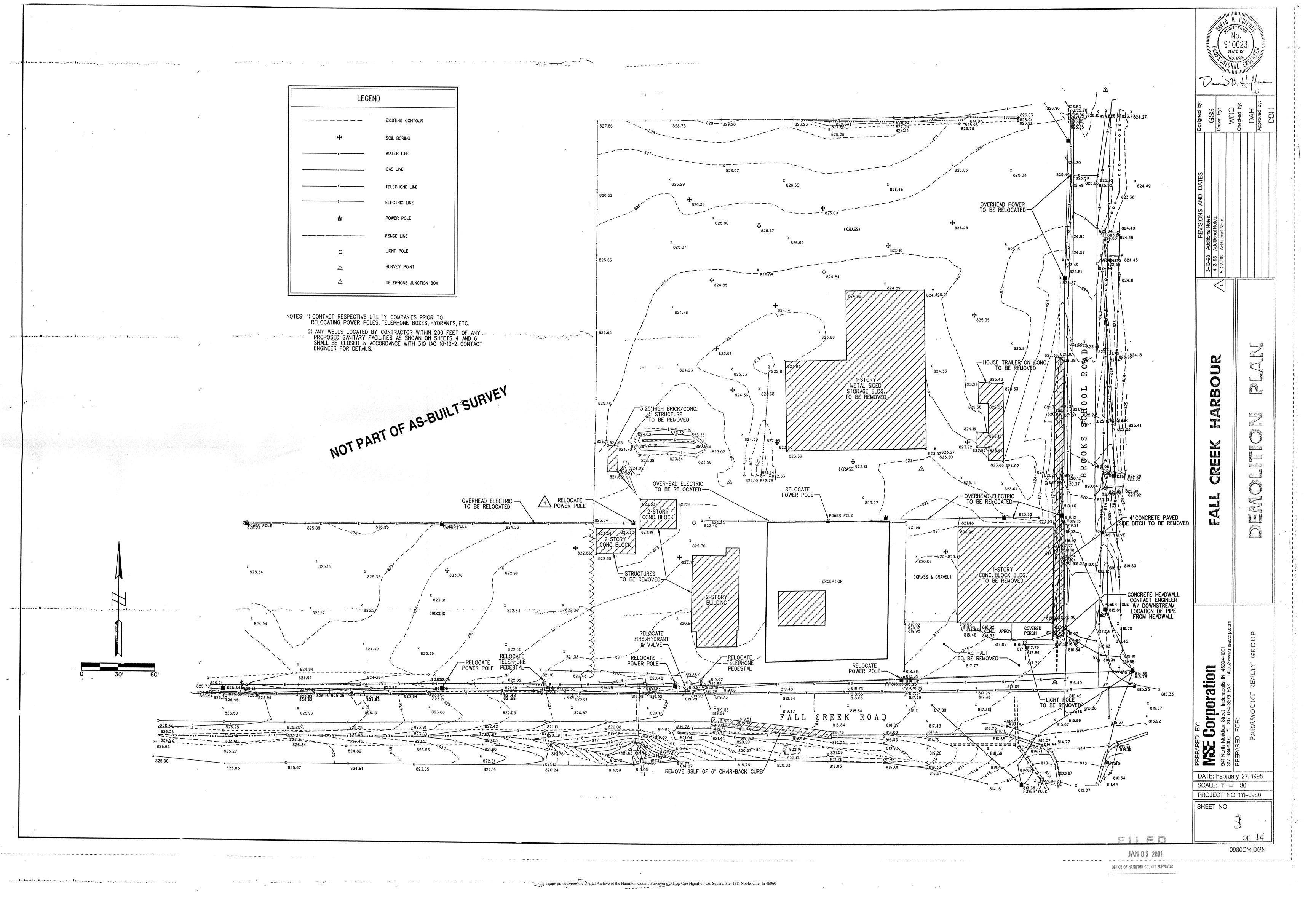
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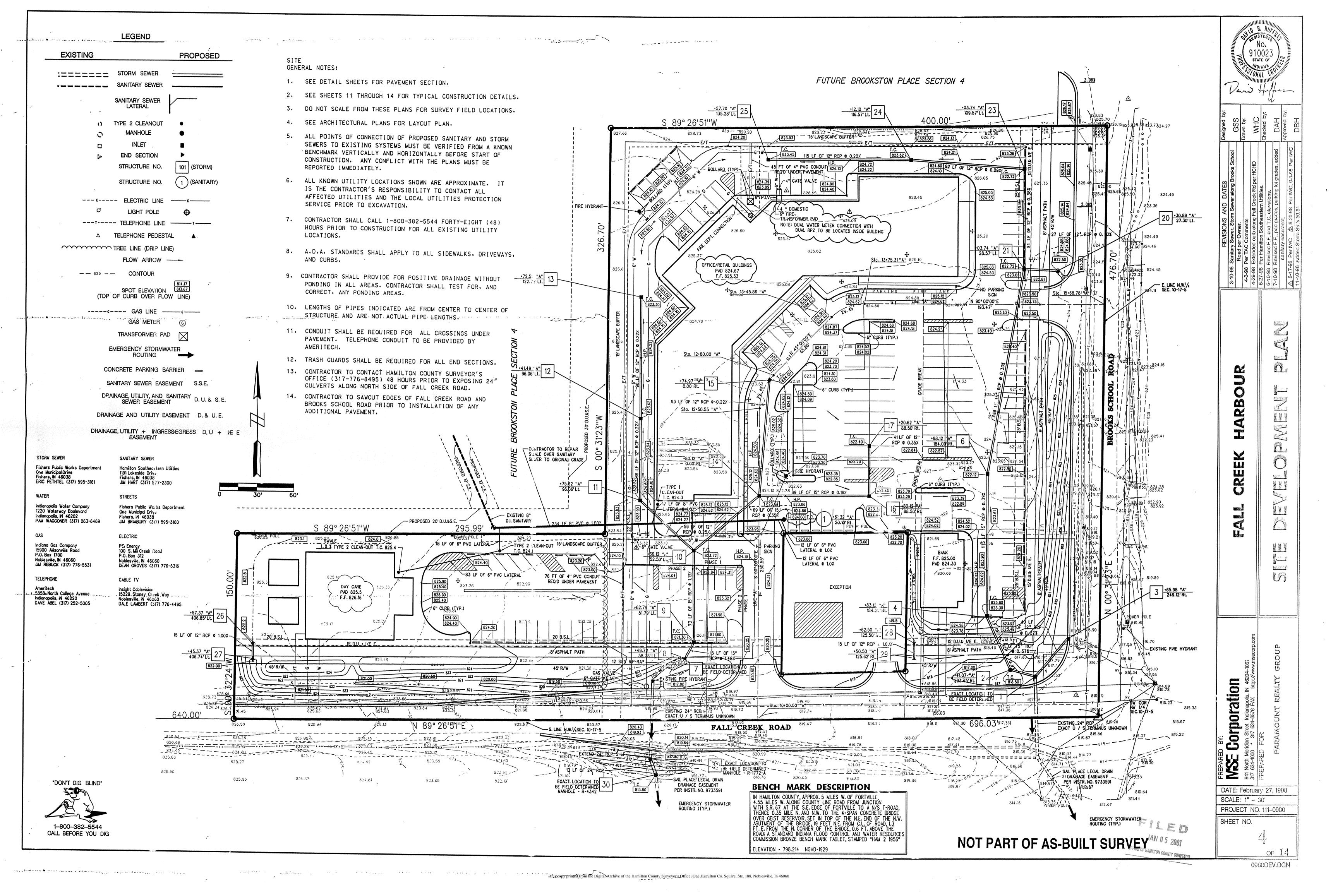
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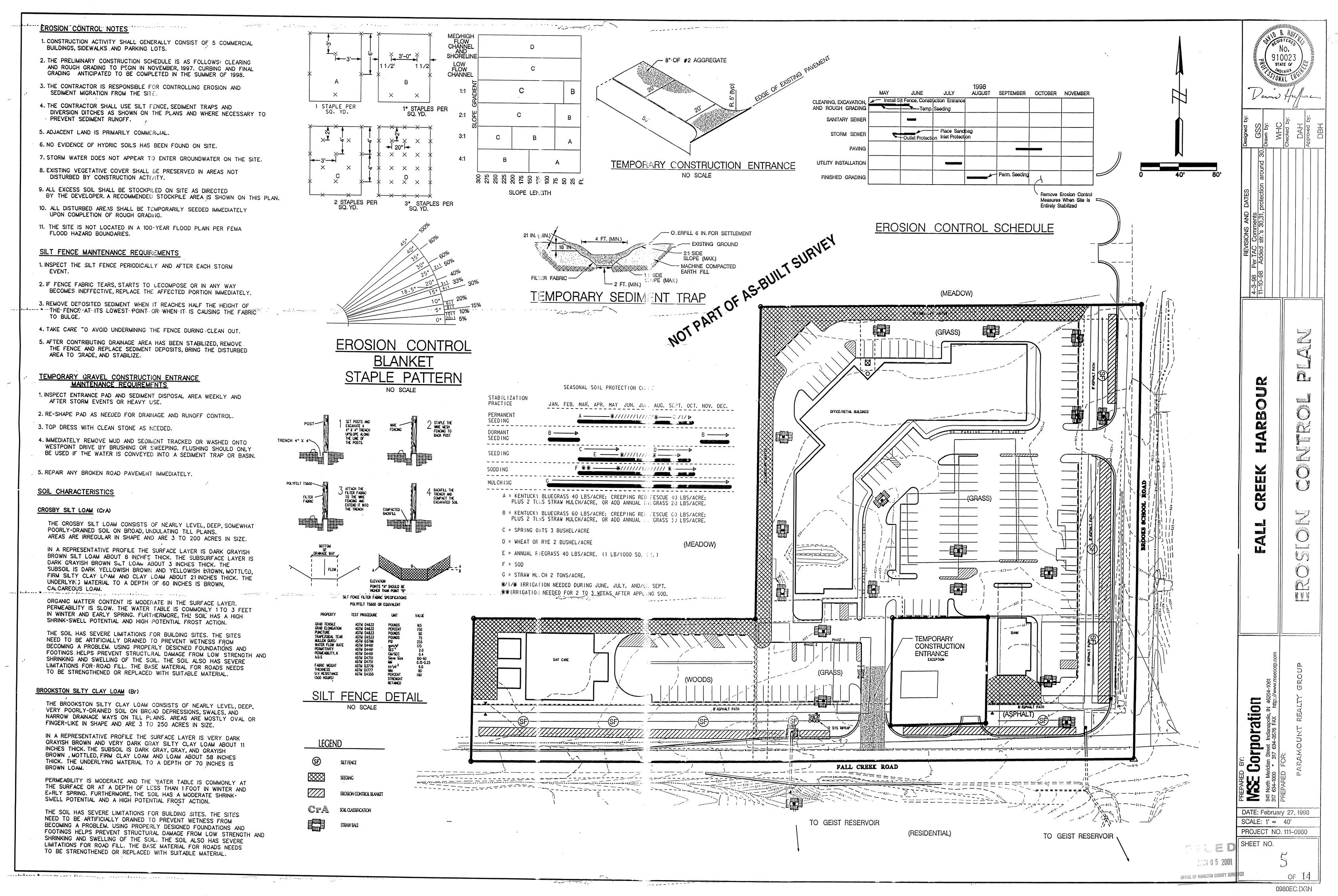
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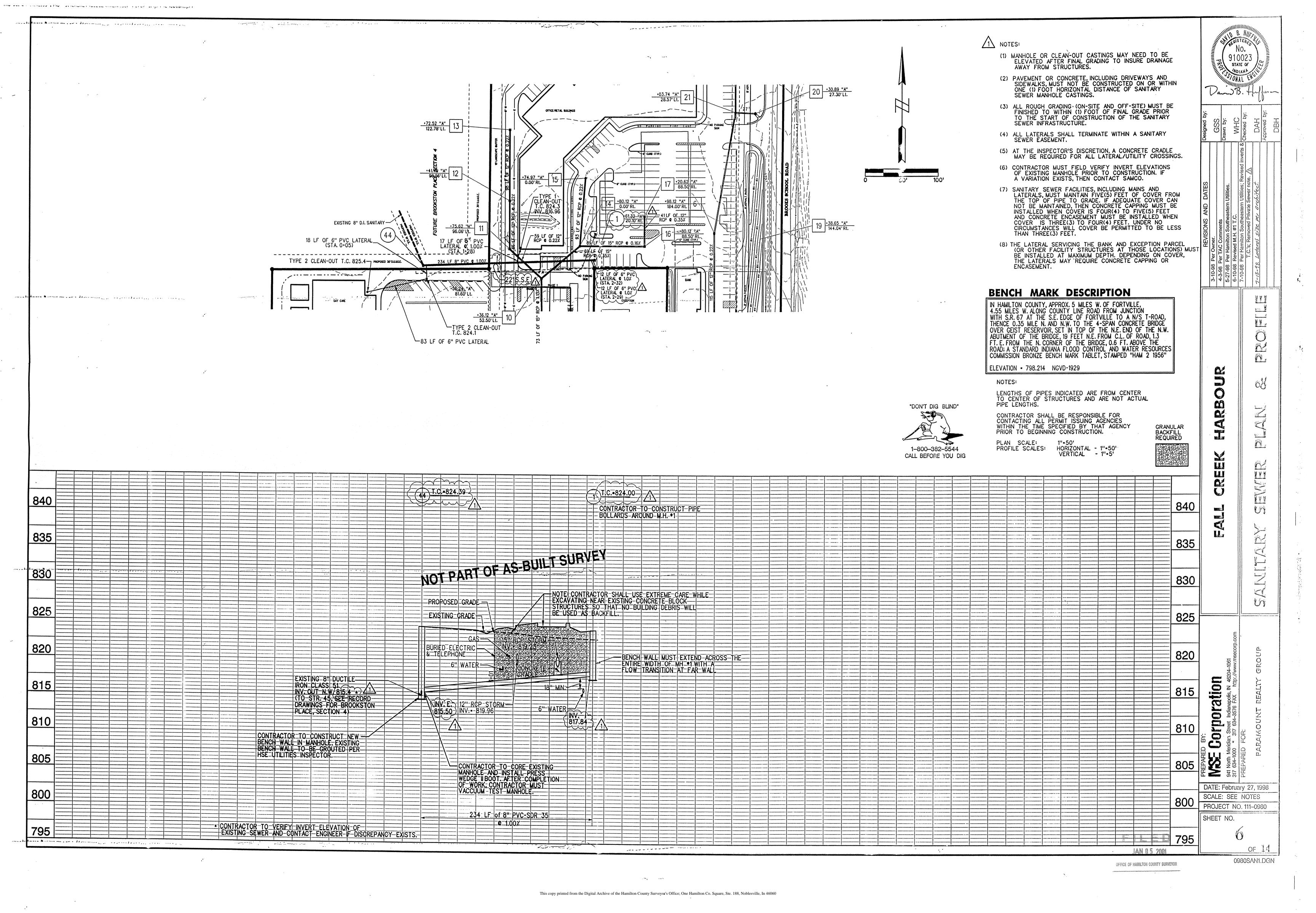
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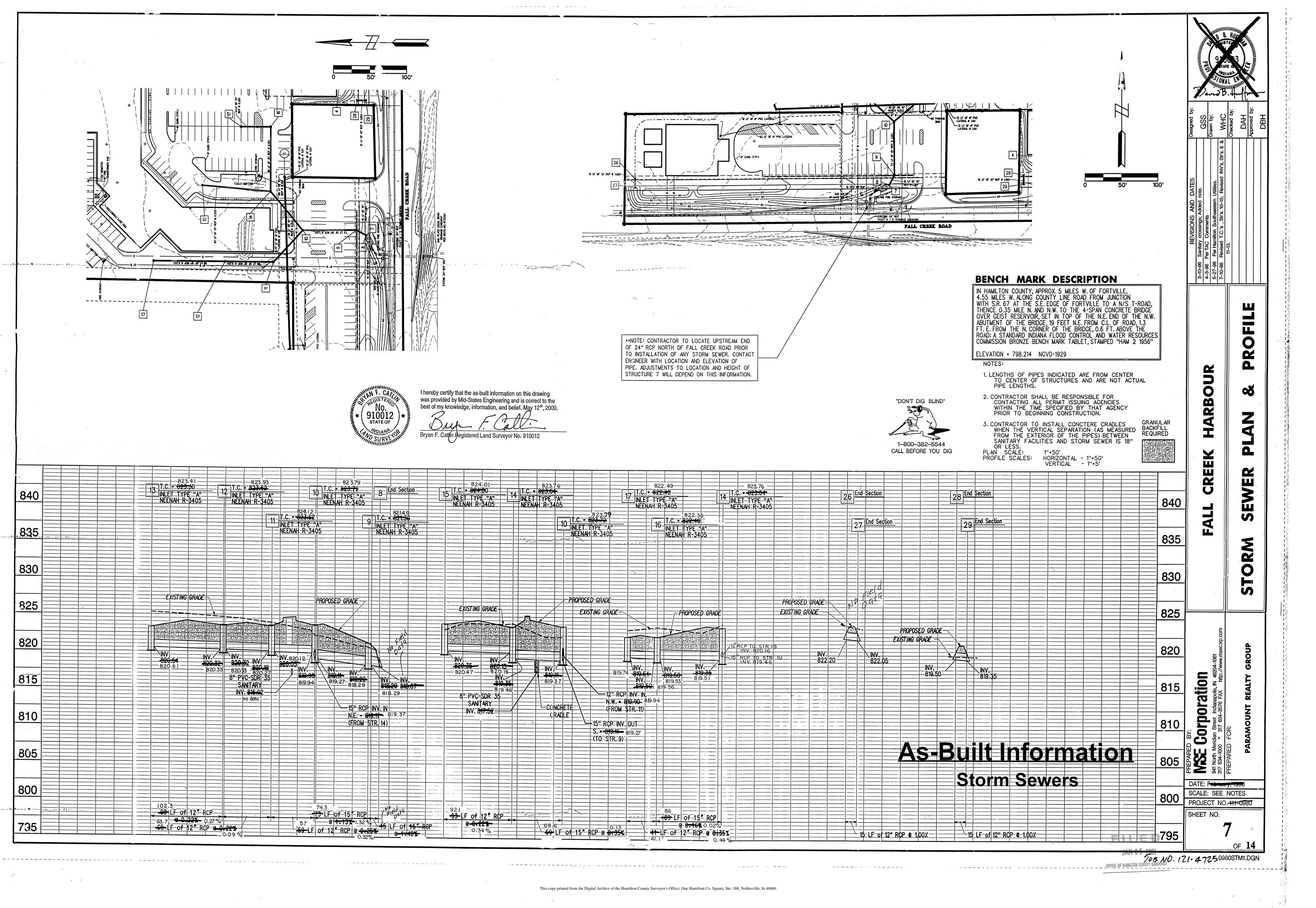
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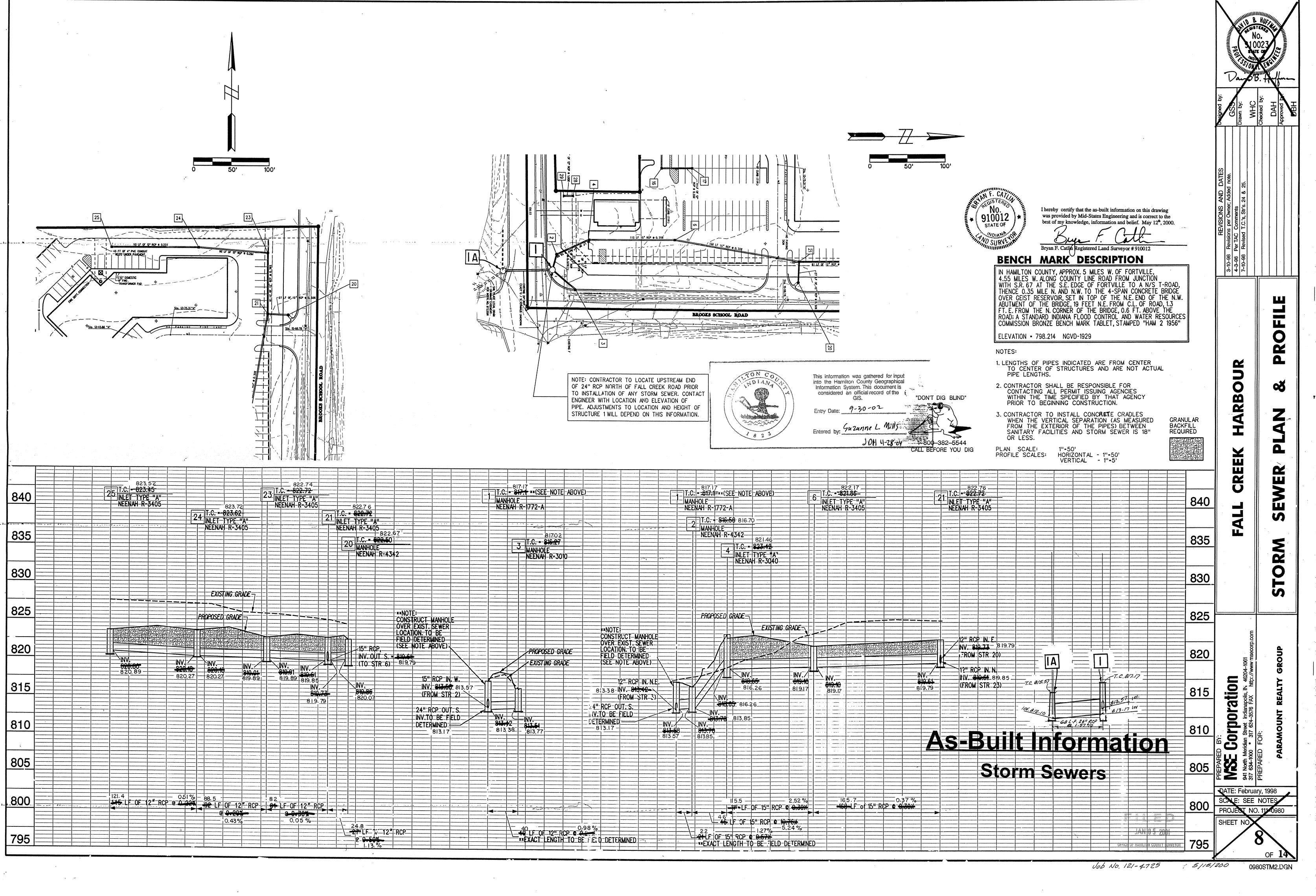






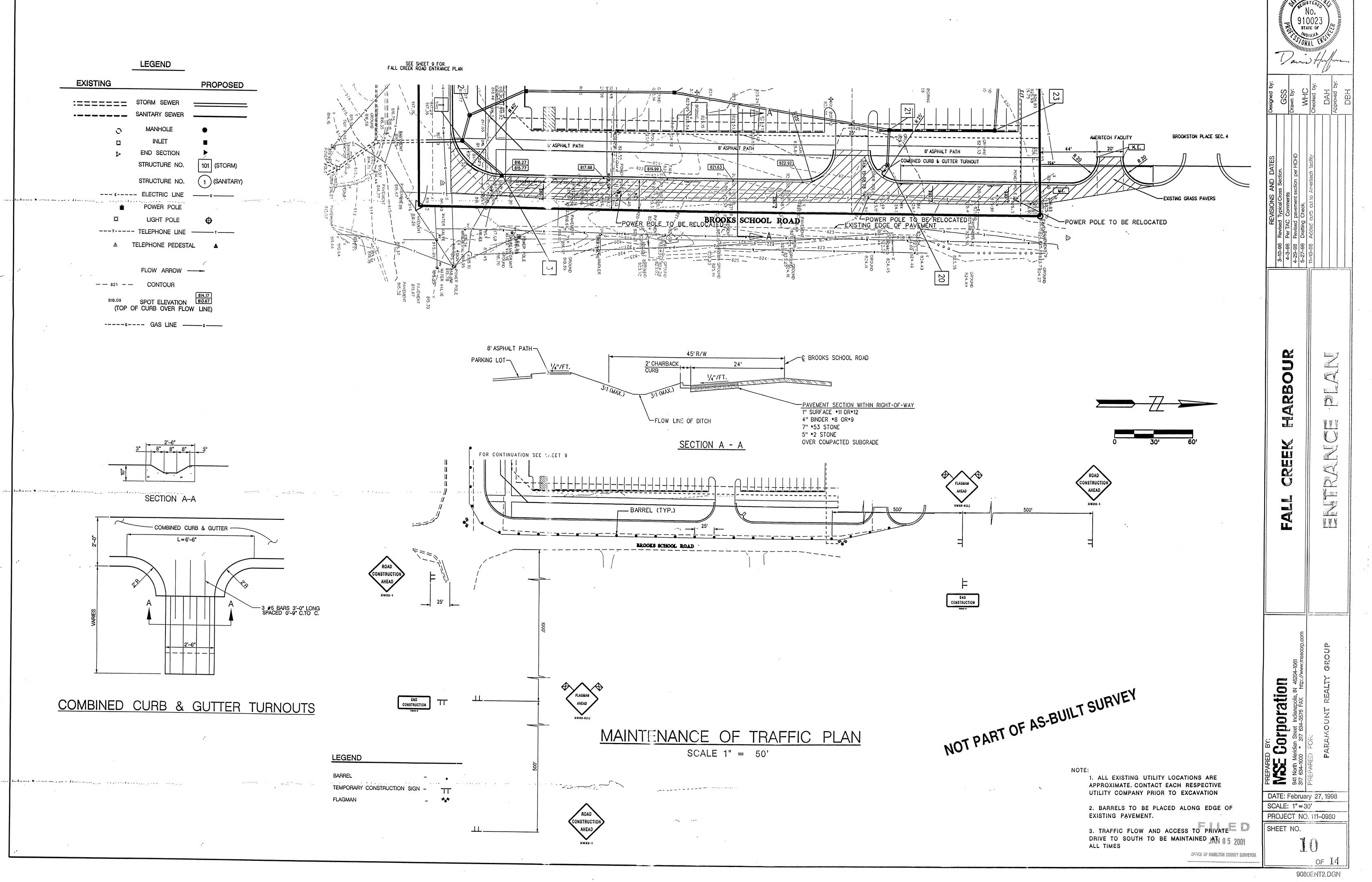




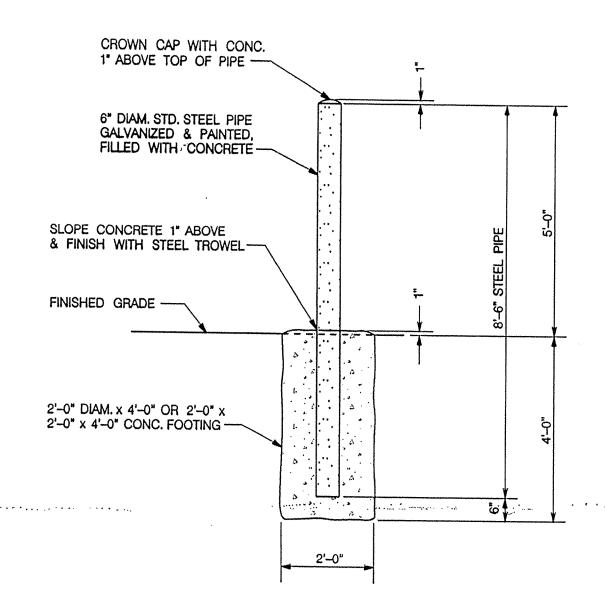


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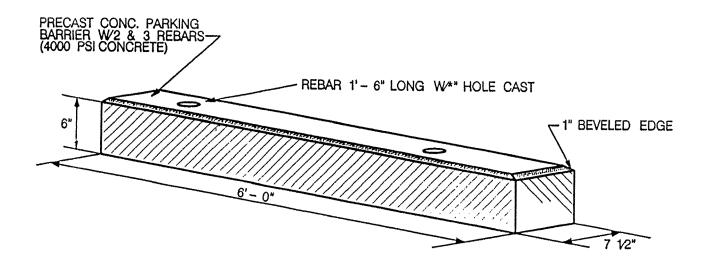
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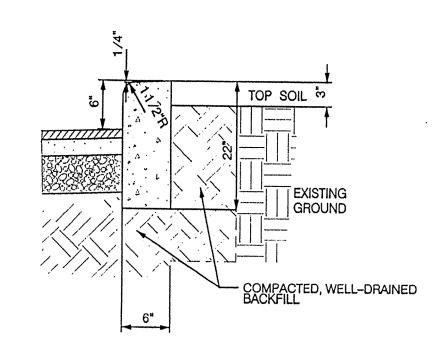
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6" STEEL GUARD POST DETAIL



PRECAST CONCRETE PARKING BARRIER



* COMPACTED SUBGRADE - THE UPPER 6 INCHES SHALL COMPLY WITH THE DENSITY REQUIREMENTS OF THE CONTRACT IMMEDIATELY PRIOR TO PLACING THE MATERIAL THEREON. ALL SOFT, YIELDING OR UNSUITABLE MATERIAL, WHICH CANNOT BE COMPACTED SATIFACTORILY, SHALL BE REMOVED. ALL ROCK ENCOUNTERED SHALL BE REMOVED OR BROKEN OFF AT LEAST 6 INCHES 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.

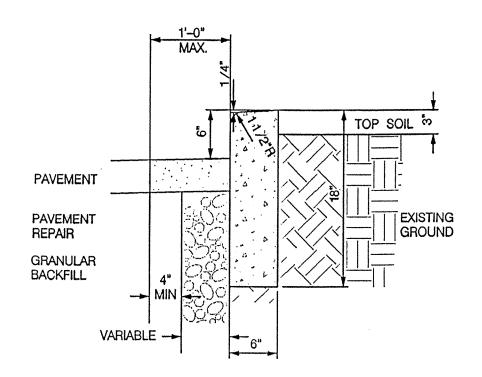
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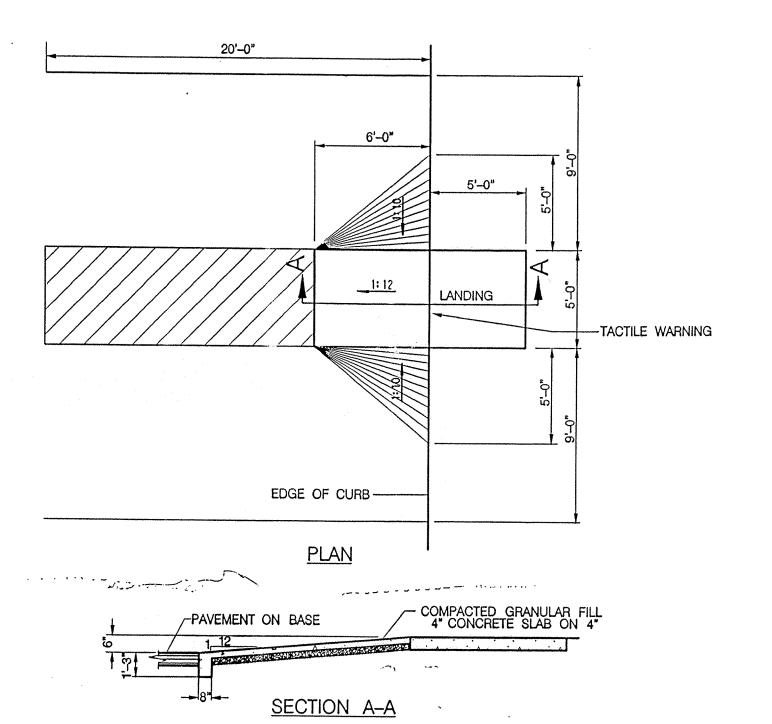
WITH THE DENSITY REQUIREMENTS FO THE CONTRACT IMMEDIATELY OR UNSUITABLE MATERIAL, WHICH CANNOT BE COMPACTED SATIFACTORILY, SHALL BE REMOVED. ALL ROCK ENCOUNTERED SHALL BE REMOVED OR BROKEN OFF AT LEAST 6 INCHES BELOW THE SUBGRADE SURFACE. ANY HOLES OR DEPRESSIONS RESULTING FROM THE REMOVAL OF UNSUITABLE MATERIAL, SHALL BE FILLED WITH SATIFACTIORY MATERIAL AND COMPACTED TO CONFORM WITH THE SURROUNDING SUBGRADE SURFACE.

MATERIAL TO THE REQUIRED ELEVATION AND COMPACTED IN LAYERS NOT TO EXCEED 4"

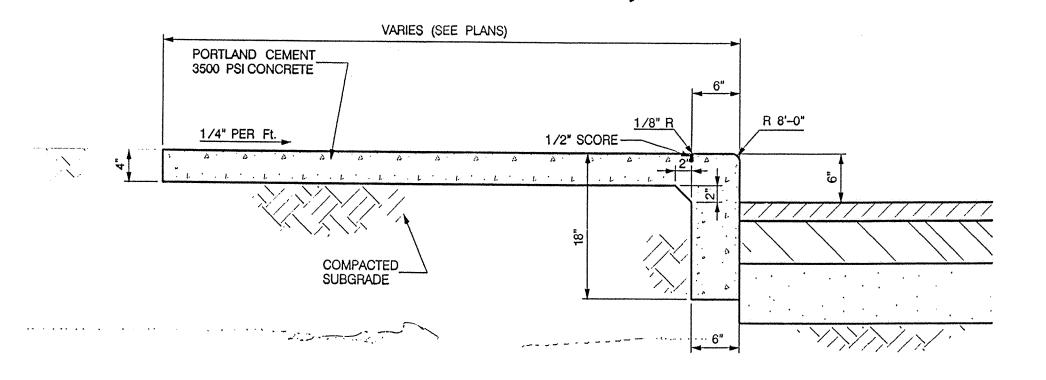
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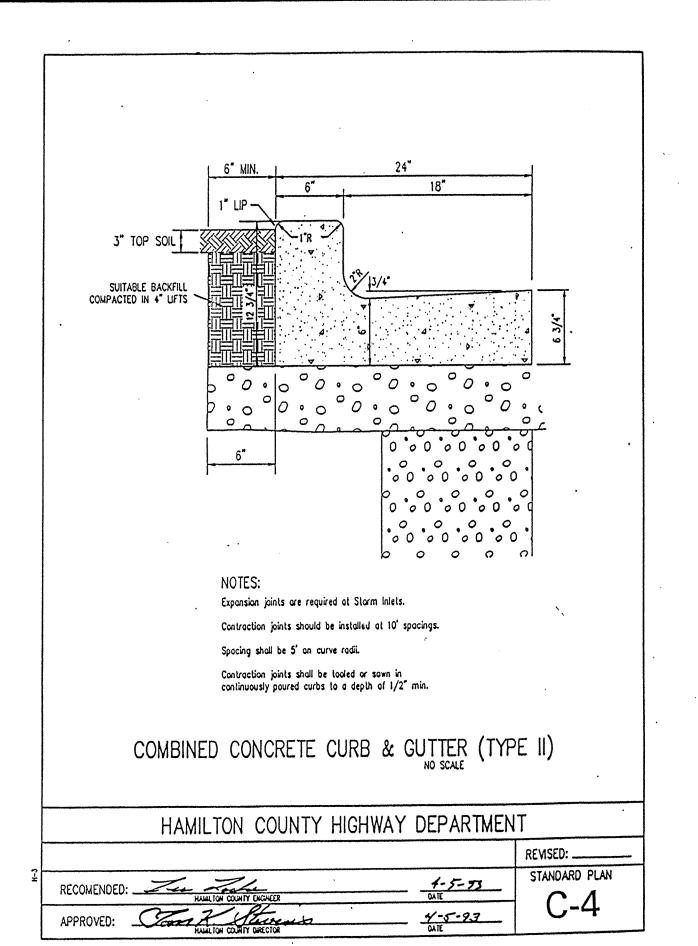
STRAIGHT CONCRETE CURB (TYPE V)



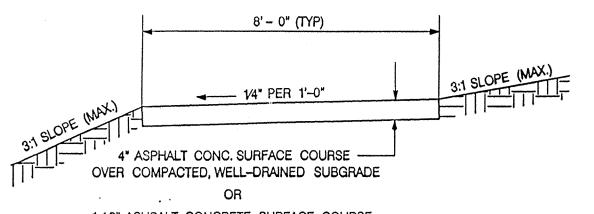
HANDICAPPED RAMP DETAIL FROM 6" CURB



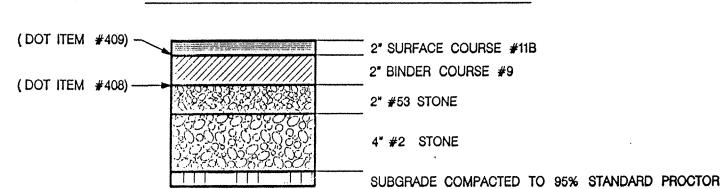
INTEGRAL WALK AND CURB DETAIL



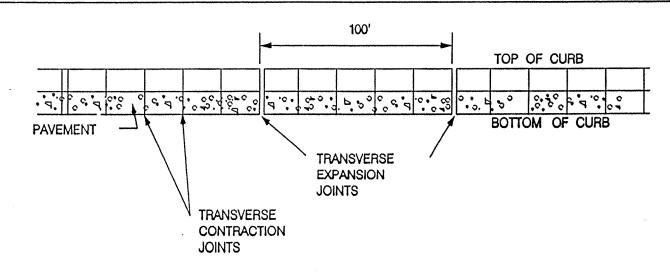
COMBINED CONCRETE CURB & GUTTER (TYPE II)



1 1/2" ASHPALT CONCRETE SURFACE COURSE 4" BITUMINOUS AGGREGATE BASE OVER COMPACTED, WELL-DRAINED SUBGRADE



TYPICAL PAVEMENT SECTION - PARKING LOT



WHEN BUILT IN CONJUNCTION WITH CONCRETE PAVEMENT, EXPANSION AND CONTRACTION JOINTS SHOULD BE PLACED AT THE SAME LOCATIONS AS IN THE PAVEMENT SLAB. THE CURB AND GUTTER SHOULD BE TIED TO THE PAVEMENT BY 1/2 " ROUND DEFORMED BARS OF ABOUT 3 FOOT INTERVALS. IF NO CONCRETE PAVEMENT IS BEING BUILT, AT THE TIME, THE CURB IS CONSTRUCTED, EXPANSION JOINTS SHOULD BE PLACED AT THE ENDS OF ALL RETURNS AND AT INTERVALS NOT TO EXCEED 100 FEET. CONTRACTION JOINTS SHOULD BE INSTALLED AT 20 FOOT SPACING. * * CURB CONTRACTION JOINTS TO BE INSTALLED AT 10' SPACING IN THE RADII OF ANY CURVES.

(WITHIN PARKING LOT)

Corporation

DATE: February 27, 1998

PROJECT NO. 111-0980

OF 14

0980DET.DGN

SCALE: NA

SHEET NO.

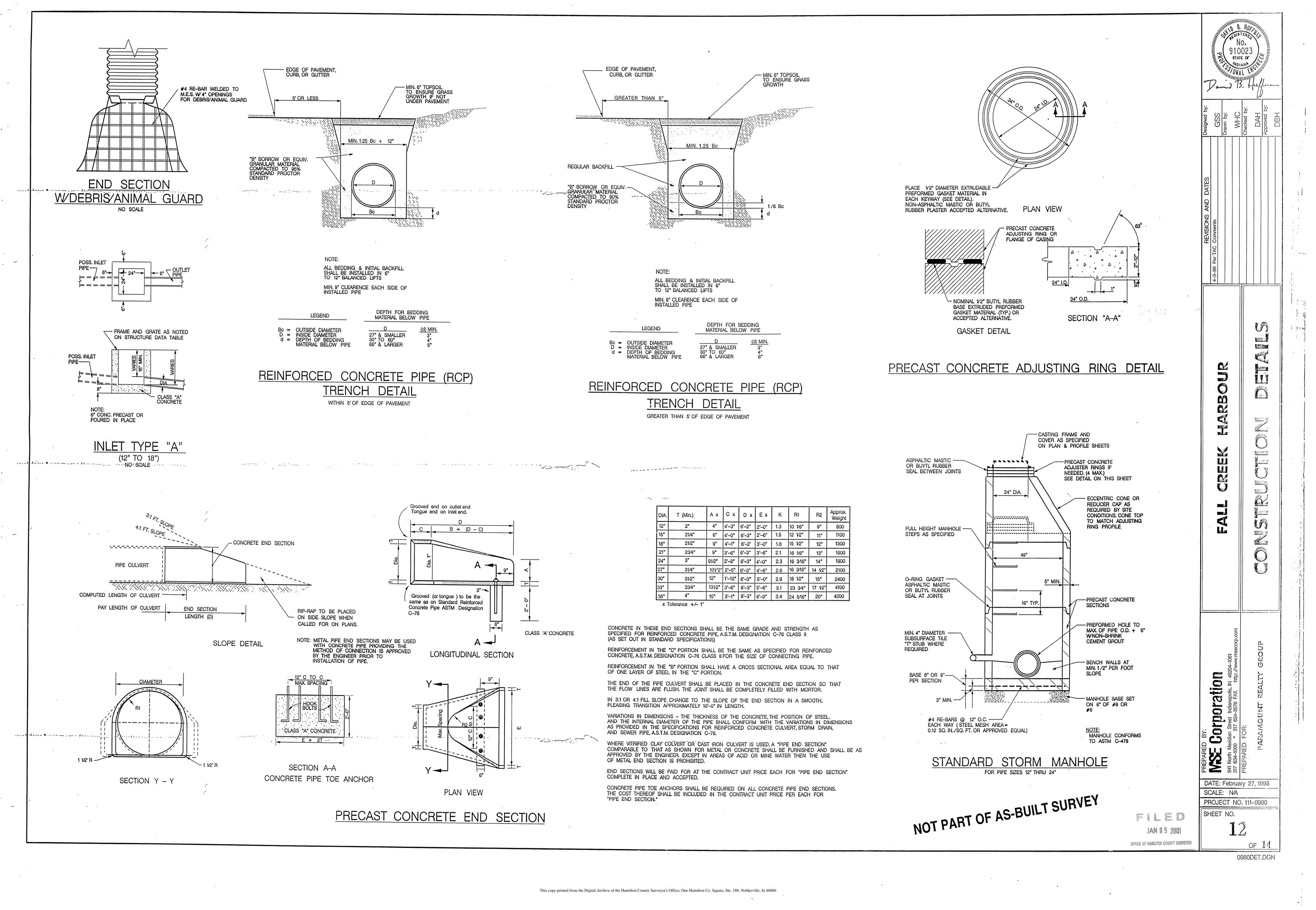
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GRAVITY SANITARY SEVER SPECIFICATIONS SECTION 0 - CENERAL REQUIREMENTS

PART 1 - CENERAL

- 1.01 Definitions For the purposes of these Gravity Sanitary Sewer Specifications ("Specifications"), the following definitions shall apply:
- HSE shall mean Hamilton Southeastern Utilities, inc., the certificated sanitary sewe utility for the Project area. HSE's address is 11911 Lakeside Drive, Flahers, Indiana 16038, and HSE's phone number is (317) 577–2300. "Engineer" shall mean the engineer for HSE, which is Sanitary Management & Engineering Company, Inc. ("SAMCO") or SAMCO's engineers. SAMCO's inspector
- od, Indianopolis, Indiana 46226, and SAMCO's phone number is (317) 898–8282. "Subscriber" shall mean those signatories identified as Subscribers under that Special Contract for Extension of Sewer Mains and Facilities with HSE through which this Project is being undertaken. Subscriber is generally the Owner under a construction contract. This definition is intended to include all employees and/or agents acting in the interest of Subscriber. "Design Engineer" shall mean the engineer sealing the construction plans, as apposed t

hall be Engineer's representative for the Project. SAUCO's address is 3030 North Post

- the Engineer for HSE and the Record Drawing Engineer, both of whom are also defined under these Specifications. This definition is intended to include all employees and/or ogents acting for or on behalf of the Design Engineer's company.
 "Record Drawing Engineer" shall mean the engineer who will certify the record drawings, as apposed to the Engineer for HSE and the Design Engineer, both of whom are also defined under these Specifications. The Record Drawing Engineer and Design Engineer may be the same person or represent the same company. This definition is
- intended to include all employees and/or agents acting for or on behalf of the Record Drawing Engineer's company. "Project" shall mean any sanitary sewer facilities constructed under a distinct set of contract documents and shall include all work necessary for the Complete and operable nstallation of all sanitary sever infrastructure and appurtenances in conformity with the -plane and details of the HSE approved construction drawings.
- "Conveyed" with regards to sanitary sewer facilities means Projects for which HSE has received title.

 H. "Private" with regards to Projects shall mean Projects from which sewage flows into HSE's sanitary sewer facilities, but for which title for the sanitary sewer facilities is not to be Conveyed to HSE. "Completed" with regards to Projects shall mean any Projects that are acceptably constructed, tested and through which customer service has been authorized by HSE, bu
- for which HSE has not received title. All applicable fees will need to be paid to HSE prior to a Project being deemed completed. "Completion Documentation" shall mean record drawings and other documentation to be submitted under HSE's Sanitary Sewer Completion Specifications. Completion Documentation must meet the applicable standards in effect at the time the documents are
- The purpose of these Specifications is to define the standards for engineering design, construction specifications and construction practices related to the Project which will allow for the orderly and proper installation of sanitary sewer facilities constructed within
- These Specifications are applicable for all sanitary sewer facilities to be constructed within HSE's service area, including Private Projects not initially intended to be connected to HSE's scrittery sever facilities
- 1.04 Liability and Costs for Project No direction, field directive, or other instruction contemplated by these Specifications and/or conducted by others shall occure any liability, charge or cost to HSE, Engineer, or indineer's inspectors.
- 1.05 Specifications and Details Sheets A. HSE's Growty Sanitary Sever Details sheet, Sanitary Sewer Specifications sheet, Duplex/Initial Triplex/Iriplex Lift Station Plan sheets, Initial Triplex/Triplex Lift Station Dectrical Diagram sheets, Lift Station and Force Main Details sheet, Lift Station and
- Force Main Specifications sheets, Standards for Design and Construction of Building Sewers, Rules and Regulations, Master Plan, Design Specifications for Sanitary Sewer Facilities and Sanitary Sewer Completion Specifications are integral parts of these specifications. The contractor should become familiar with these documents prior i construction of any sanitary sever facilities within HSE's service area... These Specifications, HSE's Gravity Sanitary Sewer Details sheet and HSE's Design specifications for Sanitary Sewer Facilities are complementary in nature and should not be interpreted individually
- These Specifications and HSE's Gravity Sanitary Sewer Details sheet, Master Plan and other standards, specifications and details are subject to revision at any time prior to the start of construction of the Project. These documents are also subject to revision at any time during construction when, in Engineer's opinion, those revisions materially affect the maintenance, operation or life of the Project. All such revised documents must replace the corresponding documents in these drawings at the time when provided to the
- HSE reserves the right to modify or waive any of these Specifications or its Master Plan and other standards, specifications and details in its best Interest. These Specifications are intended to define the construction requirements of sanitary sewer facilities which are installed and operated under typical conditions in HSC's service area. Depending on field conditions and the composition and characteristics of the scrittary sewer flow, different or unusual conditions may occur that cannot be anticipated in a document of this nature. Additional or special construction requirements may be imposed by HSE under these circumstances. 1.06 Drawing Discrepancies and Omlesions

A. Prior to the start of construction, the contractor must notify Engineer of any conflicts

pecifications. In this event, Engineer must identify the resolution of the conflict B. Any items that are not covered in the these Specifications, the drawings or HSE's other standards, specifications and details, but are required for construction of this Project, must be approved by Engineer prior to Installation and must be made a part of this C. In the event construction practices are not described, but in the Engineer's opinion, will affect the quality of construction or long term maintainability of the infrustructure, the

1_1 between the drawings, any supplemental information supplied by HSE or these

- Engineer must approve any construction practices proposed by the contractor. 1.07 Governing Laws, Codes and Regulations A. Construction practices must meet all applicable laws, codes or regulations and be in
- accordance with the requirements of all governmental agencies and public entities having These Specifications shall not be considered as a substitute, nor shall supersede, the laws, codes or regulations related to the Project. In the event of a conflict between any laws, codes or regulations governing the Project and these Specifications, the more stringent
- 1.08 Initiation of Construction Plan approval will be an authorization to proceed with construction of the Project,
- however, it shall not be construed as authority to violate, cancel or set uside any of HSE's requirements or the laws, codes, regulations and permit processes of governmental ogencies or public entities. Approval will be evidenced by an "Approved Hamilton Southeastern Utilities, Inc." stamp on the construction drawings. Plan approvals will be valid for a period of six (6) months from the date of the approval
- stomp. Extensions of this time limit may be requested from Engineer II extenuating circumstances exist. Engineer's decision regarding time extensions will be final. Prior to the start of construction, Design Engineer must receive formal written approve from Engineer. At this time, Design Engineer must supply Engineer with five (5) complete sets of construction drawings for distribution to the Engineer's inspectors and approved contractor. Contractor will not be permitted to initiate construction until the construction drawings
- are formally approved and the Subscriber has entered into all necessary agreements and authorizations with, and all required less have been public. HSE Contractor will not be permitted to initiate construction until all applicable permits have been abtained from and approved by all affected government agencies and public entities. Copies of the permits must be submitted to Engineer for review. Contractor will not be permitted to initiate construction until all off-site casements have
- been reviewed, approved and recorded by Engineer. Notice must be provided at least three (3) working days prior to the initiation of
- Once construction has commenced, the Project shall be Completed promptly and in a timely manner as directed by the Engineer. Contractor shall not discontinue work on the Project, except for weather delays, without written approval from the Engineer and in this case no sanitary sewer structures can be left open and incomplete.
- All notices required by these Specifications must be given to both HSE and Engineer at their respective business offices. 1.11 Confined Space Entry All persons, including but not limited to Subscribers, contractors, subcontractors. Design
- Engineers, Record Drawing Engineers and surveyors must abide by HSE's."Coneral Procedures for Manhale Opening and Entry" or the latest LO.S.H.A. confined space entry standards, which ever is more stringent. Also, all persons on site must obide by all LO.S.H.A. standards including but not limited to "General Construction Practices" and "Trench Safety Standards".
- 1.12 Providing Documents

 Contractor must provide HSE on a monthly basis with copies of all contracts, invoices, statements, moterial lists, payment requests, and all other related documents pertaining to the Project as these documents are generated.
- The site of the Project must at all times be kept free of trash, rubbish, unsightly materials

SECTION 1 - GRAVITY SANITARY SENERS

PART 1 - CENERAL

- This section covers all work necessary for the installation of gravity sanitary sewers and related items, including manholes, service laterals and miscellaneous concrete and other structures to convey sewage to the receiving sever in an acceptable and operable manner. Sewer pipe must be the size shown on the drawings and must meet all requirements of these
- All pipe and fitting sizes, and all reference to pipe diameter on the drawings or in the specifications are intended to be nominal size or dometer and must be interpreted as such. If a material type is shown on the drawings, that material type must describe a general collegary of materials meeting these Specifications.
- All pipe and fittings must be clearly marked in accordance with the various standards under which they are manufactured. A marking must be provided on the spigot of all pipe utilizing bell joints to indicate when

- Before delivery of products to the site (for standard yard stocked items) or before fabrication (for items that are not standard yard stocked items), contractor must provide submittals to, and obtain acceptance from, Engineer. Submittals must be thoroughly reviewed by contractor and certified to meet these specifications (with all exceptions explicitly indicated) prior to submission to Engineer. Submit the following:
- If requested by Engineer, certified copies of test reports of factory tests required by the Catalog cuts with product data, including details of manufacture, of all manufactured items. Manufacturer's recommendations on all materials and methods of installation.
- Forms of warranty. Any other submittals required by the specific Section by which the Project is being

1.03 Product Delivery, Handling and Storage

A. The contractor is responsible for the delivery, storage and handling of products.

- Deliver products with manufacturer's tags and labels intact. Handle products in accordance with manufacturer's recommendations and with extreme care so as to not damage or shock. Load and unload all products by holsts or skidding. Do not drop products. Do not skild ar roll products on ar against other products. Slings, hooks and pipe tongs must be podded. Keep stored products safe from damage or deterioration in accordance with manufacturer's
- recommendations. Keep the interior of products tree from dirt or foreign matter. Drain and store products in a manner that will protect them from damage by freezing. Store electronic and electrical products in a manner that will protect them from freezing and weather. Do not stock products unless packing indicates. Store gaskets and other products which will be deteriorated by sunlight in a cool location out of direct sunlight. Coskets must not come in contact with petroleum products. Use gaskets on a first-in, first-out basis. E. Promptly remove damaged or defective products from the Project site. Replace damaged or defective products with acceptable products.
- A. Comply with the latest published edition of American Water Works Association (AWWA). American Society for Testing and Moterials (ASTM) and American Haliand Standards Institute (ANSI) standards or as indicated in these specifications and drawings, whichever
- is more stringent. All factory inspections, tests and record keeping identified as mandatory or required under the applicable standards for each product are required under these Specifications. Factory inspections and tests that are identified as optional under the applicable manufacturing itandards are not required unless otherwise specifically indicated in the contract documents. All pipe, littings and appurtenances must be new and unused.
- The contractor must test and perform quality assurance requirements on all gravity severs, manholes, sewer laterals and other appurtenances in accordance with these Specifications. The contractor must constantly check horizontal and vertical alignment of the gravity sever. Line and Grade Requirements The contractor must provide assurance to the Engineer that the sewer is faild accurately to the required line and grade as shown on the drawings. Under no circumstances, can the
- contractor install more than three (3) manhale structures from the last verified (as-built) structure. Verification of a structure is defined as certification by a registered land surveyor or professional engineer as to octual invert elevation, length of pipe and slope. Therefore, construction is not permitted to continue until the above stated verification conditions are satisfied. Variations from a uniform line and grade as shown on the drawings and descri below are cause for the line to be rejected and relaid in compliance with these drawings. 2. Variance from design line and grade can not be greater than 1/32 of an inch per inch of pipe diameter, not to exceed 1/2 inch total, and 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. Engineer will not accept gravity sonitary sewers below minimum slope as specified in Section 33.41 of Recommended Standards For Sewage Works "Ten States Standards", (1990 idition). Reconstruction of the socilary sewers may be required at the utility's discretion. Initial Performance Tests - An initial vertical defection test and sewer water tightness test may be required on the first sections of sanitary sewer constructed of approximately 600 feet
- in length of each size and type sewer material installed. These tests will be required when, in Engineer's opinion, materials or techniques unproven with HSE are proposed, when contractor cannot show adequate experience with the materials or techniques to be used, or when field conditions warrant. No additional sewer pipe can be installed until the first section of sever of each size and type of sever material has satisfactorily passed the initial performance tests or a waiver is received. Subsequent Performance Testing - As work progresses, the Engineer may designate additional sections for subsequent performance testing as conditions in his opinion warrant. he Engineer shall notify the contractor of the location where subsequent performance test(s) are to be required not later than 15 days after the sewer is installed. Unless otherwise authorized, the contractor must arrange to commence the subsequent performance test(s)
- within 15 days after the sewer has been installed or 15 days after receiving notification by the Engineer, whichever date is later.

 Final Performance Testing for Completion — Before acceptance of the work, the contractor must check all sewers, even if previously checked, for occurate alignment and grade. Also, all gravity sanitary sewers, including manholes, sewer laterals and other appurtenances must pass all applicable test requirements of these Specifications.
- 1.05 Relation to Wells and Water Supplies A. Sewers must be laid at least 10 feet horizontally from any existing or proposed water main. The distance is to be measured edge to edge. Should specific conditions prevent this crotion, the contractor must notify the Engineer for specific instructions. Whenever the sewer crosses a water main, it should be laid at least 18 inches below the main. When the above conditions cannot be obtained, the sewer must be constructed of waterworks
- grade ductile from pipe with mechanical joints or SDR 26 PVC (ASTM D-2241) pressure sewer pipe with compression fittings. The joints must be located equidistant in both directions from the water main. The sewer must be the type of pipe described above for a minimum of 20 feet beyond the cross point. Special structural support for the water main and sewer may be required.
- D. Sewer/water supply separations and pipe classifications must conform with the latest edition strength and water tightness at least egual to the class of the adjacent main line pipe to which of the Indiana State Board of Health's ("ISBH") "On-Site Water Supply and wastewater they are joined and must conform to all other requirements specified for pipe of the Disposal for Public and Commercial Establishments - Bulletin S.E. 13.5
- Temporary Removal
- All existing utility systems which condict with the construction of the Project herein which can be temporarily removed and replaced must be accomplished at the expense of the contractor. Work must be done by the respective utility unless that utility approved in writing that the work can be done by the contractor. Permanent Relocation of Utilities It is the responsibility of the contractor to move or pay for moving water mains, storm sewer
- rilets, gas lines, wire lines, service connections, water and gas meter boxes, water and gas valve boxes, light and traffic standards, cable ways, signals, and other utility appurtenances ocated in the public right-of-way or private easement which would permanently interfere with the Project, except as otherwise noted on the plans. It is understood and agreed that the contractor has considered in his bid all of the permanent and temporary utility appurtenances shown or otherwise indicated on the plans in their present positions and that no additional compensation will be allowed for any delays, nconvenience, or damage sustained by him due to any interference from sold utility
- appurtenances or the operation of moving them either by the respective utility company or The contractor must obtain and pay for all electrical energy for power and light, gas energy, water service (including water for flushing and testing), and telephone service required for the Project during Its entire progress.
- 1.07 Installation Service The manufacturer of the pipe material, manholes, and fittings may be required to provide installation advice on bedding, haunching, and backfill to the contractor's work force installing the pipe, manholes and fittings. The need for these services will be determined by Engineer based on the experience of contractor's work force or field conditions. The service of an experienced installation representative of the manufacturer must be provided for a minimum of ten days at no additional cost to the Subscriber. The representative must be on the job site during initial pipe and manhale installation and testing, when installation problems arise or when requested by the Engineer to resolve pipe, manhole, or fitting moterial or installation problems.
- Install all products in strict occordance with manufacturer's recommendations and these Specification in a neat and workmonlike manner. Bring all conflicts between the nanufacturer's recommendations and these Specification to the attention of Engineer and
- obtain direction from Engineer as to the resolution of any conflict in installation directives. 1.09 As-Bult Record Set Contractor must maintain during the course of the Project an up-to-date plan set that occurately reflects the actual, as-built dimensions, materials of construction, horizontal location, vertical elevation and other relevant information necessary to develop a set of final, as-built record drawings in accordance with HSE's Sanitary Sewer Completion Specifications. As-built horizontal locations are required on all manholes, clean-outs, wyes, lateral markers and end of stubs (If greater than 20 feet). As-built vertical information is required for all manhole top of costing/invert elevations, clean—out top of costing elevations and upstream invert elevation of stubs (if greater than 20 feet). Failure to provide as-built
- information as specified in HSE's Sanitary Sewer Completion Specifications may require excavation to obtain this information. 1.10 Completion Documentation HSE's Sanitary Sewer Completion Specifications will govern the requirements that need to be met for the placement into service of the scrittary sewer Project. Contractor and Record Drawing Engineer must provide to HSE and Engineer in Subscriber's name the necessary Completion Documentation for the Project, including record drawings and a digital file. At the end of construction, Engineer will provide a Record Drawing Notification to the Subscriber and Record Drawing Engineer. Completion Documentation including digital file form record drawings, must be delivered by contractor and Record Drawing Engineer in the name of Subscriber to Engineer within thirty (30) days of the date
- of this notification. If the Completion Documents have not been provided within sixty (60) days of the date of this notification, HSE will procure the services necessary to generate or otherwise acquire the record drawings and other Completion Documentation at Subscriber's Contractor must submit a HSE Lateral Location form detailing all trye connections, to Engineer, on a daily basis. The Lateral Location form identifies the as-built wye station, direction, lot serviced and length of all sewer lateral connections. The as-built location of the wye station can be supplied by measuring along the pipe section and assigning a station
- to each connection from the nearest downstream manhole. An accuracy of +/- 2.0 feet is D. Record drawing engineer must also submit Sanitary Sewer Record Drawing Information shoots for all manhole structures that have not been previously as-built. These shoets must be submitted to Engineer within fourteen (14) days of the Record Drawing Notification. Contractor must Complete all outstanding Items detailed in Engineer's correspondence and supply all necessary information (including, construction cost documentation, with all applicable change orders, Sanitary Sewer Inventory form, Lateral Location forms, television logs, etc.) to Engineer in a timely manner. Contractor shall also provide timely responses to Record Drawing Engineer for questions associated with constructed conditions including. pipe sizes, pipe types, concrete encasement/capping bares, water tight castings. Type 2
- cloon-outs, fittings, etc.). If a manhole top of casting is adjusted after as-builting, then the contractor shall supply Engineer with a new measure down from the flow line to the top of casting. If the new measure down is not provided to Engineer, then the contractor must pay Engineer, at their current rate, for all time required to obtain this information. 1.11 Inspection/Reimbursement for Overtime Inspection

Full time inspection by Engineer is required for all repairs, maintenance or construction of

approved contractor list.

the sanitary sewer infrastructure performed under these Specifications. Engineer must

approve, in willing, all methods of sanitary sever intrastructure repair as recommended by

the contractor and manufacturer. Failure to comply is grounds for removal from the HSC

- Contractor must pay Engineer for all inspector's overtime cost. Contractors will be charged overtime costs of the rate of \$27.00 per hour after 3:30 pm weekdays, and all day Saturdays. The hourly rate for Sundays and holidays will be \$54.00 per hour. The above rates are subject to change without notice. Contact Engineer prior to starting construction for current If construction volume, measured in lineal feet per day, is less than what is deemed
- acceptable by the Engineer, then the contractor must pay a \$200 per day fee for additional inspection services.
- D. The inspector's decision on field changes or construction practices is final. Failure to comply is grounds for removal from the HSE approved contractor list.

201 Materials

PART 2 - PRODUCTS

- Polyvinyl Chloride (PVC) pipe and filtings must be smooth wall inside and out and must conform to: ASTM D-3034 (SDR 35 or SDR 26 or SDR 23.5), Type PSN or CAN/CSA-B182.2.M90, the more stringent shall apply, for sizes up to 15-inches; ASTM F-679 (T-1; 1-2 as approved by Engineer) or AASHTO M278 or CAN/CSA-B182.2.M90, the more stringent shall apply, for sizes greater than 15-inches; ASTM D-2241 (SDR 26 or SDR 21) for sizes up to 24-inches; AWWA C-900 (DR 25 or DR 18), for sizes up to 12-inches; AWWA C-905 (DR 26 or DR 21), for sizes greater than 12-inches. Minimum cell classification of pipe 15-inches or less in size must be 12454-B or 12454-C or 13364-8 or 12364-C as defined by ASTM 0-1784. Minimum cell classification of pipe greater than 15-inches in size must be 12454-C or 13364-8 or 12364-C as defined by ASTM 0-1784. All pipe must have a minimum tensile strength of 34.50 MPa as defined by ASTM
- Transition to and from ASTM D-3034 to ASTM D-2241 must be with ductile iron, MJ solid sleeve fittings with transition gaskets. Joints on PVC sewer pipe must 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 must be so designed to avoid displacement of the gasket when installed in accordance with manufacturer's recommendations. The joint must comply with ASTM F-477 and the physical requirements of ASTM D-3212 and UNI-B-1 "Recommended Specifications for Thermoplastic Pipe Joints. Pressure and Non-Pressure., the more stringent shall apply. The gasket must be the only element depended upon to make the joint flexible and watertiaht. All PVC pipe types can be used at depths (from invert to finished grade) of less than 20 feet. At depths between 20 feet and 25 feet, ASTM D-3034 (SDR 26 or SDR 23.5) or ASTM D-2241 (SDR 26 or SDR 21 with a minimum pipe stiffness of 115 or greater) or AWWA C-900 (DR 25 or DR 18 with a minimum pipe stiffness of 115 or greater) or AWWA C-905
- 26 or DR 21 with a minimum pipe stiffness of 115 or greater) can be used. PVC Truss Pipe must be the wall bell and spigot type with elastomeric seal joints and smooth inner walls meeting or exceeding all of the requirements set forth in ASTM 0-2680. PVC Truss Pipe must have a minimum pipe stiffness of 200 psi for each diameter when measured at 5% vertical ring deflection and tested in accordance with ASTM D-2412. The fill materia must be Portland Cement, Perlite Concrete or other inert fill material exhibiting the same degree of performance.
- Joints must be the flexible gasketed compression type so that when assembled, the gasket inside the bell will be compressed radially on the pipe spigot to form a watertight seal. The gaskets sealing the joints must be made of rubber of special composition having a texture to assure a waterlight and permanent seal and must be the product of a manufacturer having al loost five (5) years experience in the manufacture of rubber gaskets for pipe joints. The gasket must be a continuous ring of flexible joint rubber of a composition and texture which is resistant to common ingredients of sewage, industrial wastes and groundwater, and which will endure permanently under the conditions likely to be imposed by this service. The gasket must conform to the requirements of ASTM F-477. NO SOLVENT CEMENT JOINTS WILL BE ALLOWED. Truss Pipe can be used at depths (from invert to finished grade) to 25 feet.
- Ductile iron (DI) pipe must most ASTM A-746 or AWWA C-151 with exterior asphaltic cooting per AWWA C-151 and Interior asphaltic cooting meeting AWWA C-151 or polyethylene lining complying with ASTN D-1248 of nominal 40 mil thickness. Thickness design must be in occordance with AWWA C-150. Joints on DI pipe must be the integral bell type gasketed joint meeting AWWA C-111. mechanical joint (MJ) meeting AWWA C-111, or ANSI 125 lb. flanged joint. Accessories for mechanical and flanged joints must be alloy steel "T"—head balt and hex nut of Coarse Throad Series Class 2A (External) and Class 28 (internal) per ANSI 81.1. Ductile Iron Pipe can be used at depths (from invert to finished grade) to 35 feet. Thickness class must be as follows: Class 50 (6°-20°), 51 (24°) and 53 (30°-36°) or Pressure class 350 (6"-24"). For the class of ductile pipe to be used for drop manhole and/or lift station connections refer to the Drop Manhole Details of HSE's Cravity Sanitary Sewer Details
- All pipe must be clearly marked in accordance with the various standards under which they A marking must be provided on the spigot of all pipe utilizing bell joints to indicate when the pipe is driven home. Factory Inspections and Tests All factory inspections, tests and record keeping identified as mandatory or required under the applicable standards for each pipe type are required under these Specifications. Factory inspections and tests that are identified as optional under the applicable manufacturing standards are not required unless otherwise specifically indicated in the contract documents.

sheet or HSE's Lift Station Plan sheet.

- A copy of the manufacturer's inspection or test report (where necessary by the applicable manufacturing standards) and a certified statement by the manufacturer that the material has been sampled, tested, and inspected in accordance with the applicable manufacturing standards must be provided prior to installation of the pipe. Each certification and report must be signed by an authorized agent of the manufacturer or saller. Fittings such as wyes, tees, and bends must be made in such a manner as will provide
- corresponding class and diameter. Joints must be of the same type as used on the adjoining Fabricated fittings (not molded as a single integral piece) and saddles will not be allowed. Manholes and Other Structures
- Manhales must be constructed of manolithic concrete or precest manhale sections. Precest manhale sections must conform to requirements of ASTM C-478, latest revision, and manhale joints must conform to the requirements of ASTN C-443, except that the joint design of the precast sections must consist of a bell or groove on one end of the unit of pipe and a spigot or tangue on the adjacent end of the joining section. Moterials for manholes, and miscellaneous concrete structures must comply with the
- Concrete for precast manhole sections and mandithic manholes must use 4000 psi concrete. Ready-mix concrete must conform to ASTM C-94 Alternate 2. Maximum size of aggregate must be 1-1/2 inches. Slump shall be between 2 and 4 inches. Reinforcing steel must conform to ASTN A-615, Crode 40 deformed bors, or ASTN A-616, Grade 40 deformed bars.
- Sand ASTM C-144, passing a No. 8 sieve. Cament - ASTM C-150, Type 1. Water - Must be potable. . Joints on precost manhale sections must utilize rubber gaskets meeting the requirements of ASTM C-443, Including Sections 6.16, 6.17 and 9, latest edition. O-ring gaskets must be confined in a groove in the spigot end of the precast manhole section. Profile gaskets must
- bear on a lateral face of the tangue so as to provide positive positioning. The joint must be further sealed as noted on the Sanitary Manhole Detail of HSE's Cravity Sanitary Sewer The manufacturer of the precast manholes must provide factory cut openings to produce a smooth, uniform, cylindrical hole of the proper size to accommodate the resilient connector, Resilient connectors can alternately be precast-in-place by the manufacturer. All pipes entering and leaving a manhole must have a resilient connector meeting the requirements of ASTM C-923 firmly clamped around the pipe. The resilient connectors must be PSX gasket or Press Wedge II as provided by Press-Seal Gasket Corp.; similar flexible manhole sleeves
- turnished by Kor-N-Sect, by NPG Systems, Inc.; or equal. Precast manhole sections must be steam cured and can not be shipped from the point of manufacture for at least five days after having been cost without prior written consent of ingineer. Precast manhale sections can be shipped upon written consent of Engineer prior to 5 days after having been cost if they were manufactured of early high strength concrete and are verified through testing to have achieved a strength acceptable to Engineer. Manhole costings must be of good quality cost iron conforming to ASTM A-48 or ductile iron conforming to ASTM A-536 Grade 65-45-12 with concealed pick-hole. Refer to HSC's
- Gravity Sanitary Sewer Details sheet for detailed information. Unless specifically designated otherwise, manhole castings must be the non-locking type. Manhale steps must be made from a steel reinforcing rod encapsulated in a copolymer polypropylane resin. The manhole steps must equal or exceed OSHA requirements. Manhole steps manufactured by M.A. Industries, Inc., PS-1-PF, Clay & Boiley Hig. Co., or equal, are acceptable.
- Any other special manholes and miscellaneous concrete structures must be constructed as Manhale bases must be cast-in-place concrete, reinforced as shown on HSE's Cravity Sanitary Sewer Details sheet, or combination pre-cost concrete base and first section. Detailed drawings must be submitted to the Engineer prior to costing or manufacture. Concrete bench walls must slope at 1 inch per foot from manhole wall to channel. Channel height must be equal to largest pipe diameter.
- No interior surface applied materials shall be used. Fiber mesh reinforcement for Type 2 clean-outs. Application per cubic yard shall equal a minimum of 1.5 pounds. Fibers are for the control of cracking due to drying shrinkage and thermal expansion/contraction, to lower concrete permeability, to increase impact capacity, shotter resistance and abrasion resistance, while added fibriliated taughness and residual strength. Fibraus concrete reinforcement shall be manufactured by Fibermesh, 4019 industry Drive, Chattanooga, Tennessee, 37416 or other manufacturers as approved by Engineer on a case by case basis.

PART 3 - DECUTION

- 3.01 Inspection and Rejection of Materials The quality of all materials, the process of manufacture, and the finished product are subject to inspection and acceptance by the Engineer. Such inspection may be made at the place of
- manufacture or on the worksite after delivery, or at both places; and the product are subject to rejection at any time for failure to meet any of the manufacturer's specification requirements even though samples may have otherwise been accepted as satisfactory. immediately prior to being incorporated into the Project, each product must be carefully Inspected, and those not meeting these Specifications and HSE's Gravity Sanitary Sewer Details sheet will be rejected, immediately removed from the site and replaced at contractor's

02 Handling and Cutting Pipe

washing when test is satisfactorily finished.

Each product to be incorporated into the Project must be handled into its position, placed and supported only in such manner and by such means as the Engineer accepts as satisfactory. Pipe and fittings must be handed carefully to avoid cracking or obrasion of the coating. Handle in a manner to insure installation in sound and undamaged condition. Do not drop or bump. Use slings, lifting lugs, hooks and other devices designed to protect pipe, joint elements and coatings. Ship, move and store with provisions to prevent movement or shock contact with adjacent units. Handle with equipment capable of performing the work with an adequate factor of safety against overturning or other unsafe procedures. Any filling showing a crock and any fitting or pipe which has received a severe blow that could have caused an inciplent fracture, even though no such fracture can be seen, must be

marked as rejected and removed at once from the site. To visually examine DI pipe for

with cement to check for crocks invisible to the eye. Remove turpentine and cement by

incipient tractures, paint the bell, spigot, or other suspected partions with turpentine and dust

Smooth cut by power grinding to remove burrs and sharp edges. Repair lining as required and approved by Engineer. All cut ends must be examined for possible crocks caused by cutting. Truss pipe must be cut with a hand saw. . Smooth cut by power grinding to remove burns and sharp edges. 2. Care must be taken with truss pipe to protect the filler moterial. All field cuts must be sealed C. according to manufacturer's recommendations. PVC pipe must be cut with either a hand saw or power saw. Smooth cut by power grinding to remove burns and sharp edges.

In any pipe showing a distinct crack and in which it is believed there is no incipient fracture

be made in the borrel at a point at least 12 inches from the visible limits of the crock.

All field cutting of pipe must be done in a neat, trim manner. Field cut pipe will only be

allowed at manholes, tees, wyes and at the connection of new sanitary sewer to existing

a. Cut ductile iron pipe in a neat workmanlike manner without damage to pipe with-

Carbarundum saw or other method approved by Engineer.

sanitary sewer. The cut end must be beveled using a file or a wheel to produce a smooth

bevel of approximately 15 degrees and a minimum depth of 1/3 of the pipe wall thickness.

Cutting of Pipe

Ductile Iron Pipe

beyond the limits of the visible crack, the cracked portion, if so approved, may be cut off the

contractor before the pipe is laid so that the pipe used will be perfectly sound. The cut must

- A. All rough grading (on-site and off-site) must be finished to within 1.0 foot of final grade prior to the start of construction of the sanitary sewer infrastructure. Contractor shall install , all off-site laterals with a minimum cover of six (6) feet from the top of pipe to grade. Laterale will be considered off-site if they are constructed in an area that will not be platted immediately following construction Completion. Pipe laying must proceed upgrade, beginning at the lower end of the sewer. The sewer segment downstream from any connection made to an existing sever must be cleaned by a jet-rodder with vactor truck immediately after the connection to the existing sewer and plugging of the connection is finished. All pipe must be bedded as described in this Specification under Pipe Bedding and
- Hounching and according to HSE's Cravity Savitary Sewer Details sheet. Bell holes must be excavated in advance of pipe laying so the entire pipe barrel will beer uniformly on the prepared sub-grade. The supporting of pipe on block will be permitted only where the sewer line is to receive total concrete encasement. Encased pipe must also be accurately and effectively supported on a crossing re-bor "X". All pipe must be laid occurately to the required line and grade in the bedding as shown on the drawings, and in the manner prescribed by the pipe manufacturer and appropriate
- ASTM/AWWA specifications, to form a close, concentric joint with the adjoining pipe and to bring the invert of each section to the required grade. PVC (polyvinyl chloride) gravity sewer pipe and fittings must, at a minimum, be installed in accordance with the directions contained in ASTM D-2321. DI pipe must be installed in occordance with AWWA C-600. Obtain approval of Engineer of method proposed for transfer of line and grade from control At a minimum, the contractor must use loser beam equipment to maintain occurate dignment and grade. A qualified operator must 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 must be provided to circulate the air. However, air velocity can not be so excessive as to cause pulsating or vibrating of the beam. Before proceeding to the next joint of sewer, the last joint must be checked for proper line and grade.
- Survey instruments copable of third order accuracy must be used for checking alignment and grade throughout the Project. It is the contractor's responsibility to regularly test all equipment to assure compliance with manufacturer's specifications. Clean interior of all pipe and fittings prior to installation. When bell and spigot pipe is loid, the bell of the pipe must be cleaned of mud, sand and other obstructions and wiped out before the clean spigot of the next pipe is inserted into it. The joint must be made in a satisfactorily manner in accordance with the recommendations of the nanulacturer of that particular type of joint and the direction of the Engineer. The new pipe must be showed "home" firmly against the back of the bell and securely held until the joint has sealed. All joint work must be done by experienced workmen. Each length of pipe must be mechanically pulled "home" with a winch or come-along against the section previously laid or pushed by means of block and push-bar, and held in place until the trench and bedding are prepared for the next pipe section. Care must be taken in loying 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 "home" and staying in place Use of hydraulic excavating equipment as the means of pushing or moving the pipe to grade will not be permitted. Locate pipe joint to provide for differential movement at changes in type of pips embedment or at changes in trench bottom material. Do not locate joint within 18 inches of structure wall. Clean and lubricate all joint and gasket surfaces with lubricant recommended by manufacturer. Utilize methods and equipment capable of fully having ar making up joints without damage. Check joint deflection for specified limits. When using truss pipe, the first joint of pipe going in and out of each munhole shall
- incorporate a factory sealed bell coupling. Do not let water fill trench. Do not lay pipe in water. Include provisions to prevent flotation should water control measures prove to be inadequate. Perform pipe installation only when weather and trench conditions are suitable. Alian pipe to reach trench air temperature prior to installution in ditch. Open excavation must be satisfactorily protected at all times. At the end of such day's work, the open ends of all pipes must be protected against the entrance of allina's, and then, earth, or debris by bulkheads or stoppers. Provide adequate backfill to prevent flotation. .: un pipe. Any earth or other material that enters the main sewer or any lateral sever three plants such open and or unplugged branch must be removed.
- install a temporary mater tight plug at the end of the sewer whenever installed p; is left. unattended. All water, earth or other material that enters sewers owned or opening to its must be removed from the trench before removed of the valorticht plug. An air Spit, auter tight plug must also be maintained in the Project at the point of connection with the existing sewer at all times from the initiation of construction to the Completion of the Project. In the event any water, earth or other material enters the downstream sewer, the contraction is responsible to HSE for the costs of sewage treatment, dectrical power, equipment source. incidental damages, cleaning and any other costs or expenses related to such enc. Q. Pipe shall be installed as previously stated and as per UNI-B-5 "Recommended P. the Installation of Polyvinyl Chloride (PVC) Sewer Pipe", the more stringent shall a
- 3.04 Pipe Bedding and Haunching A. Each pipe section must be laid in a firm foundation of bedding material and houncing and backfilled with care. These materials must be placed and compacted in accordance main ASTM D-2321. Prior to pipe installation, carefully bring bedding material to grade along the entire in it. of
- pipe to be installed in accordance with HSE's Gravity Sanitary Sewer Details sheet. It is the opinion of the inspector or Engineer soil conditions are unslable, then the tranch in accordance with HSE's Gravity Sanitary Sewer Details sheet. be compacted to 95% standard proctor density prior to installing the sever, from and allowed earth to the crown of the pipe. For flexible pipe such as PVC, the placement of embedment material or haunching
- the pipe must be done with care. The ability of the pipe to withstand loading in a transfer depends on a large part on the method employed in its installation. Care should to turn so not to compact directly over the top of the pipe. Where excevotion occurs in rock or hard shale, the trench bottom must be underect and a minimum of 6 inches of 12 crushed atone must be placed below the bedding zone pives
- prior to pipe installation. Casing wall thickness as per Section 716 - Jacked Pipe of the "Indiana Department of Transportation 1993 Standard Specifications" or latest edition. All work within right-of-ways shall be in accordance with the requirements of the governmental agency having jurisdiction. Where no procedures for a particular partial of the work are given, the recommendations of the "Indiana Department of Transportation Standard Specifications," latest edition, shall be followed.
- At the Engineer's discretion contractor shall fill carrier pipe with mater to prevent illustion and misalianment during grouting. Engineer recommends preliminary low pressure oir and mandrel testing of the carric. prior to grouting Upon completion of the bore, invert elevations must be provided to Engineer to validate corrier pipe is on grade.
- 3.06 Concrete and Concrete Capa, Cradies and Encasement A. The strength of concrete indicated in all drawings, details and specifications must to 25 day compressive strength. B. Concrete caps, grades and encasement must be provided at all locations indicated at the drawings. When so ordered by the Engineer, concrete cops, cradles and encasement and shown on the drawings will be installed. All concrete cops, crades and encasament must be in accordance with HSE's Cravity Sanitary Sewer Details sheet. At the Engineer's discretion, contractor must take four (4) cylinders per five (5) contractor of concrete and provide certified test results to Engineer.
- D. All ductile iron pipe and fittings shall have a minimum of 6 mil polyethylane wrop justice istallation of concrete 3.07 holes and Other Structures A 1...hole channels or inverts must be formed and poured with concrete to the grow. 10.0 ...necting pipe in accordance with HSE's Gravity Sanitary Sewer Details sheet. The shed invert must be a semi-circular shaped smooth channel directing the flow t. instream sewer. Changes in direction in base channels must be accomplished by instant radius turns in the channel joining the downstream channel taggentially. Curici strall be RE-CRETE 20 minute set or approved equal and shall use Dayton Superior's J-60 R-40 or approved equal liquid bonding agent. Patches over one (1) inch thick shall u...
- 3/8" Red-Head anchors. B. more approved by the Engineer, any manhale added to an existing sanitary sewer must be constructed per the Sanitary Manhole Detail of HSE's Cravity Sanitary Sewer Details sheet. in dog house or saddle structures will be permitted. Ductile iron fittings must be used cutside of the manhale. The entire length, both sides of the new manhale on the existing sower, must be low pressure air tested and deflection tested and the new manhole vacuum essled while maintaining continuous service. Cast-in-place monolithic concrete manholes, and other cast-in place concrete structures must be cured for a minimum of seven days prior to backfilling.
- Livy holes out in the field must be smoothly and cleanly drilled with a core-drill or in a manner acceptable to the Engineer. All pipes entering and leaving the manhole must utilize o resilient connector of the same type as required for new construction. antroctor shall install steps with a minimum horizontal separation of twelve (12) inches from all pipes entering and leaving the manhole or structure. l'alished grade around manhales and manhale costings must be set at an elevation to pre.... surface water runoff from running over or panding on the top of the manhale. At manhale frames must be securely anchored to cone or adjusting ring with balts and
- anorele anchors adequate in length to penetrate into the riser ring as shown on HSC's the Engineer has the right to cut cores from such pieces of the concrete manhole startle s us he desires for such inspection and tests as he may wish to apply. Hales left by the innoval of cores must be filled in an acceptable manner so as to effectively form a water test and ructurally sound repair. Engineer has the right to take samples of concrete after it has been mixed, or c. it is awing placed in the forms or molds, and to make such inspection and tests thereof as its may

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at grout used to seal or join structures must be non-strink grout.

- 3.08 Laterals, Stubs, Connections, Bulkheads, and Miscellaneous Items of Project A. Where existing sewers corrying socilary sewage are encountered, the contractor must provide and maintain temporary connections or redundant pumping systems to prevent a nuisance. Where called for on the drawings, lateral connections and stubs for future sewer connections must be provided. Lateral locations must be recorded on a HSE Lateral Location Form and
- field marked as shown on HSE's Gravity Sanitary Sewer Details sheet. The contractor can not connect any existing sewers or house services into the Project orion to the finishing of all tests and placement into service by HSE without the written permission of the Engineer. Laterals shall be installed to cross storm severs and other utilities at approximately ninety
- (90) degrees and shall maintain a minimum harizontal separation of ten (10) feet from all
- 3.09 Existing Utilities, Structures and Property A All improvements, including poles, trees, lences, sewer, gas, water or other pipes, wires, condults and manholes, rairoad tracks, buildings, structures and property along the routes of the sanitary sewers must be supported and protected from damage by the contractor. Movable Items such as mail boxes can be temporarily relocated during construction, provided their function, if any, is maintained. Place movable items in their original location
- immediately after bookfilling is finished, unless otherwise shown on the drawings. Replace n kind any movable items which are damaged during construction. * The contractor shall proceed with coution in the excavation and preparation of trenches so that the exact location of underground utilities and structures, both known and unknown, can be determined. The contractor is responsible for the repair of utilities and structures when broken or otherwise damaged.
- Whenever, in the opinion of the Engineer, it is necessary during the progress of the Project to explore and excavate to determine the location of underground structures, the contractor must make explorations and excavations for such purpose. Wherever pipes or conduits cross the trench, the contractor must support said pipes and conduits without damage to them and without interrupting the work. The manner of supporting such pipes, etc. is subject to the approval of the pipe or conduit's owner.
- When utility lines have to be removed or relocated for the Project, the contractor must notify the Engineer and utility line owner in ample time for the necessary measures to be taken to prevent interruption of the utility's service. The contractor must conduct the work so that no equipment, material, or debris will be placed or allowed to fall upon private property in the vicinity of the Project unless the contractor has first obtained the property owner's written consent thereto and provided a copy to the Engineer.
- All excavated material must be piled in a manner that will avoid obstructing sidewalks, driveways and thoroughlares. Hydrants under pressure, valve pit covers, valve boxes, curb stop boxes, fire and police call boxes, or other utility controls must be left unobstructed and accessible during the Project. Contractor must prevent runoff from stored piles of excavated material from entering ditches, waterway, gutters or storm sewers. All streets, alleys, povements, parkways and private property must be thoroughly cleaned each day of all surplus materials, earth and rubbish placed thereon by the contractor.
- Keep excavations free from water until all sewers and appurtanances to be constructed in the excovations, are Campleted and will salely withstand forces from water. Provide sufficient dikes and de-watering equipment and make satisfactory arrangements for the disposal of the. water without undue interference with other work, damage to property, or damage to the environment. Water disposal must be in compliance with the regulations of the Environmental Protection Agency (EPA), Indiana Department of Environmental Management (IDEM), Soil Conservation Service (SCS) and all other applicable agencies. Operate dewatering equipment ahead of pipe loying or to keep the water level below the
- excavation until structures are secured by backfill. Contractor must, at Engineer's discretion, provide de-watering equipment, shoring or other construction practices deemed necessary by Engineer. All wells (potable, non-potable and de-watering) shall be drilled and abandoned in accordance with the requirements of the Indiana Administrative Code, Indiana Department of Natural Resources - Croundwater Section, Hamilton County Health Department and all other governmental agencies and public entities having jurisdiction.
- All excavation work must incorporate safety measures that comply with applicable 1.0.S.H.A. regulations and these Specifications. In the event of a conflict, the more stringent requirement must apply. Trees, boulders, and other surface encumbrances, located so as to create a hazard to employees involved in excavation work or in the vicinity thereof at any time during operations, must be removed or made safe before excavating is begun. Do not open more than 75 feet of trench in advance of the installed pipe, unless otherwise
- directed or permitted by the Engineer. Excavate the trench within 6 inches of full depth for a distance of at least 30 feet in advance of the pipe laying, unless otherwise directed or Contractor must provide sloped side walls (provided that the bottom 4 feet of trench will not e sloped), sheeting, shoring or trench boxes as safety measures for all excavations in accordance with 1.0.S.H.A. regulations. Contractor is responsible for the determination of the angle of repose of the soil in which the trenching is to be done. Excavate all slopes to beyond the angle of repose, but not steeper than a 1 foot rise to each 1/2 foot harizontally, except for areas where solid rock allows for line drilling or pre-slitting, or where sheeting, shoring or a trench box is to be used. Sides, slopes, and faces of all excavations must meet accepted engineering requirements by
- scaling, benching, barricading, rock bolting, wire meshing, or other equally effective means. Give special attention to slopes which could be adversely affected by weather or moisture Flatten the excavation sides when an excavation has water conditions, sitty materials, loose boulders, and areas where erosion, deep frost action, and slide planes appear. Excavations must be inspected by a competent contractor's representative after every rainstarm or other hazard-increasing occurrence, and the protection against slides and caveins must be increased, if necessary. Do not store excavoled or other moterial nearer than 4 feet from the edge of any excavation
- Store and retain materials so as to prevent materials from falling or sliding back into the excavation. Install substantial stop logs or barricades when mobile equipment is utilized or allowed adjacent to excavations. The maximum clear width of trenches in earth for manhales must be the greatest external width of the structure plus the space necessary for the construction and removal of the forms
- 10. The design of the sewer pipe and structures is predicated upon the width of trench specified in HSE's Crovity Soultary Sewer Details sheet. The contractor is responsible for the provision and installation, at his own expense; of such remedial measures as may be directed by the Engineer, should the specified trench width limits be exceeded. 11. Test the air in excavations in locations where oxygen deficiency or gaseous conditions are possible. Establish controls to assure acceptable atmospheric conditions. Provide adequate ventilation and eliminate sources of ignition when sammable gases may be present. Attended emergency rescue equipment, such as breathing apparatus, a safety homess and line, and basket stretcher, must be readily available where adverse atmospheric conditions may exist or develop in an excavation. Provide walkways or bridges with guardrals where employees or equipment are required as
- permitted to cross over excavations. Provide ladders where employees are required to be in excavations 4 feet deep or more. Ladders must extend from the floor of the excavation to at least 3 feet above the top of the excavation. Locate ladders to provide means of exit without more than 25 feet of lateral Provide adequate barriers and physically protect all excavations. Barricade or cover all wells, pits, shafts, and similar excavations. Backfill temporary wells, pits, shafts, and similar
- excavations upon termination of exploration and similar operations. Bookfilling must meet the requirements of ANSI/AWWA C-600 unless otherwise specified in these Specifications. 2. Do not backful trenches and excavations until all utilities have been inspected by the Engineer and until all underground utilities and piping systems are installed in accordance with the requirements of the respective utility company, these Specifications and the
- Project's construction drawings. 3. Place and tamp bedding and backfill in a manner which will not damage the pipe, pipe coating, wrapping or encasement. . Unstable Trench Bottom Material Replacement: Contractor must insure that all voids in the replacement material placed to stabilize the trench bottom must be filled with the fines or mud encountered prior to placement of the granular pipe embedment material. Excess dry replacement material without visible fines or mud will not be acceptable. Clean Bockfill: When used in these Specifications, the term "clean backfill" shall mean any backfill material of any type that is free of roots, brush, sticks, debris, junk, cinders, broken concrete or brick, large lumps of day, trazen material or stones greater than 6" in their largest dimensions. Not more than 15% of the rocks or lumps can be larger than 2.5° in their
- largest diameter. . All job excavated materials which are used for trench backfill above pipe embedment and which are to be compacted by any method except settlement by water, must be "clean backfill" and must be of such composition that said materials can be compacted to 90% relative compaction by the compaction method used and with water added, if needed, to bring them to optimum moisture content. Material excavated from an open trench can be used for backfilling from pipe cover material to 6" below frished grade providing it meets the requirements of "clean backfill" and providing a different type of backfill material has not been specified or shown on the construction drawings. Where excavated material is used for backfilling and there is a deficiency due to the rejection of a part thereof, the contractor, upon direction of the Engineer, must remove the rejected motorial from the site and furnish an additional quantity
- of dean backfill at his own expense. Excavated material must be placed immediately after the hand backfill. Such backfilling can be done from the top of the trench by mechanical means, or directly from trucks by depositing the backfill on a slope equal to the angle of repose of the material and allowing it to flow progressively forward in such a manner as to prevent the farmation of voids. earth backful must be compacted to at least 95% of maximum dry density or mounded 6° The backfill in no case can be dropped from such height or in such volume that its impact upon the force main or structure will cause damage. The Engineer reserves the right to
- regulate and control the manner of depositing such backfill, but in any case, the contractor will be held liable for damage to the sever or structures. .). Settling of backfill by flooding or pudding will not be permitted. I. Excess trench material must be roughly graded over the trench in a timely manner soon after the pipe is installed. This material must be mounded over the trench with a crown height of no more than 6°, feathered to existing grade, until final settlement has occurred and the trench is ready for grading and cleanup. An exception to this would be trenches in traveled pathways. Any excess greater than needed must be houled off and disposed of ar stored by
- the contractor. 12. After settlement of backfill and immediately before restaration of vegetated areas, grade and remove excess earth in unpaved areas to be restored. Remove to 6" below finished grade. Place 6° of topsol over entire area to be restored.
- 3.11 Site Maintenance, Restaration and Georging

 A. This section partains to the maintenance of the Project site during the work and the restoration of the Project site upon Completion of the work. The Project site must be promptly and regularly maintained in a neat manner, without rubbish, surplus material or other unsightly conditions. Project site must be deened at the and of each work day. Trash receptocles must be provided as necessary to dispose of waste Restaration of improvements on private property and private improvements in the public
- Restoration of rood surfaces, drainage ways, and other similar improvements within the public right-of-way or acquired easements must be in accordance with the directions of the governing authority having jurisdiction. All vegetated areas disturbed or damaged during construction must be re-vegetated with a stand of grass. Agricultural areas and areas currently under construction do not require re-Bockfills, fills and embankments must be brought to a sub-grade level six inches below finished grade. When sub-grades have settled, deposit and spread topsoil to a finished depth of at least six inches; fine roked, ready for seeding.

right-of-way must be in-kind and acceptable to the property owner.

- 2. Commercial fartilizer, 6-12-12 or equal, must be uniformly spread at the rate of 35 pounds per 1,000 square feet over the topsoil by a mechanical spreader at least 48 hours before seeding, and mixed into the soil for a death of two inches. A grass seed mixture comprised of 35 parts Kentucky Blue Grass, 30 parts Perennial Rive. 30 parts Kentucky 31 Fescue, and no more than 5 parts their matter must be sown on the
- disturbed areas at a rate of 3 pounds per 1,000 square feet. Seeding must be done only between August 15 and October 15, and from April 1 to June 1. Seeded areas must be mulched with straw, hoy, wood callulose fiber, or cone fiber. Straw or hoy must be applied at a rate of 2.5 tans per acre. Wood cellulose or cone fiber mulch must be applied at a rate of 1,000 pounds per acre. Manufactured mulch materials such as soil retention blankets, erosion control netting, or others may be required by Engineer on special areas of high water concentration, unstable soils or sloped surfaces. Manufactured
- mulch materials must be installed according to the manufacturer's recommendations. 5. The seeded areas must be thoroughly watered with a line spray to not wash out the seed, and maintained and patched as directed by Engineer. A satisfactory stand of grass at least 1 inch in height without bare spots will be required.
- Within 3 months after Project Completion, the contractor must correct defective work, such as settled areas, uneven rood surfaces, bare spots in grass coverage, erasion and guilles.
- 3.12 Sewer Cleaning Prior to Teeting At Engineer's discretion, prior to mandrel test, the Project must be deaned with jet rodder and vactor truck to remove mud, all and construction debris.
- 3.13 Deflection Testing L. All PVC and truss sewer (non-lateral) pipe must be tested under the observation of the Engineer for deflection with an acceptable go-no-go mandret. The testing must be conducted after the final bockfill has been in place for at least 30 days (potentially longer depending on weather conditions and at the Engineer's discretion) and all other utilities have been installed. Notification must be provided at least three (3) working days prior to mandrel testing. No pipe can exceed a deflection of 5%. The deflection test must be conducted using a mandrel having a diarneter equal to 95% of the inside diameter of the pipe. The test must be performed without a mechanical pulling device and the rope used to pull the mandrel must be no alronger than 150 pound test. Tog/trail rope may be of any size to allow removal a mandrel. The mandrel must be pulled by a single individual of average size, weight and strength without the use of tools to gain leverage. All pipe exceeding the atomable deflection must be replaced or repaired, at Engineer's discretion, and retested. Engineer reserves the right to require an additional mandrel test of sections of flexible pip which are crossed by storm sewers within filteen (15) days prior to the initial mandrel lest

Sewers with "sugs" greater than one-half (1/2) inch will not be accepted by Engineer

or at anytime after the initial test.

- 14 Sewer Water Tightness Testing Water lightness testing in the Project for the purpose of placing the senitary sewers in service must be initiated after all other utilities have been installed. Contractor must provide notification at least three (3) working days prior to the initiation of any water tightness testing. If sections of sever must be activated before all utilities are installed provisions shall be made to allow testing of those sections at that time, however, these sections must be relested at the contractor's expense after installation of the remaining sewers and other
- Acceptability Limits Maximum infiltration/exfiltration limits for all new sanltary sewers will be 50 gallons per inch of diameter per mile of pipe per 24 hours. This standard is applicable to each discrete section of the Project and includes all manholes and lateral service connections. All sections of the sewer must be tested, and any sections not meeting these limits must be repaired and
- The contractor shall note the special provision that the first section of sewer of each size and moterial type must be given a satisfactory water tightness test before proceeding with any additional construction if required by the Engineer. Tests for water tightness must be conducted on all sewers in the Project. Tests must be conducted by the contractor in the presence of the Engineer. The contractor must furnish and install all equipment necessary for the tests. Where the test results are in excess of the allowable limits, the contractor must correct the
- construction of the sewer and relest so that the section tested is within the allowable limit. All methods and materials used in the repair must be accepted by the Engineer in writing. Grouting of joints is not an acceptable repair method. The groundwater level at each manhole on the section being tested must be determined by the contractor by providing a 3/8-inch LD. pipe through each manhole barrel at an elevation near the invert base. Aggregate must be placed on the outside of the pipe to prevent clogging. The end of the pipe on the inside of the manhole must contain fittings, together with a vertical transparent pipe, to determine the groundwater level. The pipe through the manhole must be permanently sealed after the tests have been finished. The program of testing must be determined by the Engineer using (1) Inhitrotion Test for Leokage, (2) Extitration Test for Leokage, and/or (3) hir Test for Leokage.
- Infiltration Test for Leakons The infiltration test may be used where the natural groundwater table is a minimum of 2 feet over the top of pipe section being tested. The test must be considered by plugging off the upper end of the pipe section being tested and placing a weir or allplable measuring device in the pipe at the lover end of the section. Sufficient L. t be allowed for the water level over the weir to stabilize before reading the flow. Exfiltration Test for Leakage
- The extituation test for lookage may be used where the natural groundwater table is less than 2 feet over the lop of pice in the section being tested.
- pressure or other adequate method. This step is important because it fushes out construction
- The groundwater level surrounding the section of sewer under testing must be determined by the procedure previously outlined. If the groundwater table is above the pipe, then test pressures must be increased according to the following formula: the air pressure should be increased 0.43 psi for each foot of water over the lowest crown.) Once the pipe outlet plugs are securely in place, pressurized air is introduced to the system. The air must be fed through a single control panel with three individual hose connections as From control panel to pneumatic plugs for inflation in sewer pipe.

From control panel to sealed line for introducing the pressurized air.

- From sealed line to control panel. This line will enable continuous manitoring of the air pressure rise in the sected line. The air must be introduced slowly to the section of pipe under evaluation until the internal air pressure is raised to 4.0 psi greater than the hydrostatic pressure head created by the existence of groundwater that is over the pipe section. A minimum of two minimum state provided for the air pressure to stabilize to conditions within the pipe. (This simulation period is necessary for variations in tury argure to adjust to the interior pipe conditions.) Air can be added slowly during the stabilization period to
- maintain a minimum pressure of 4.0 psi greater than the hydrostatic pressure created by After the stabilization period, when the pressure reaches exactly 4.0 psi greater than the hydrostatic pressure created by groundwater, the stopwatch must be startes; and when the pressure reaches 3.0 psi greater than the hydrostatic pressure created by grandwater, the watch must be stopped. The portion of the line being tested will be acceptable if the time for the air pressure to decrease within the stated range is greater than the time shown on Table
- Safely Precoulions During Air Test The air test may be dangerous if, because of ignorance or cordessness, a live is improperly prepared. It is extremely important that the various plugs be installed and traced in such a way as to prevent blowouts. Inosmuch 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 expansion of a poorly installed plug or a plug that is partially deflated before the pipe pressure is i deased can be As a salety precaution, pressurizing equipment should include a regulator set at 10 psi to

avoid over pressurizing and damaging an otherwise acceptable line. No one is allowed in

the manholes during testing. 3.15 Wanhole Toeting All manholes must be vocuum tested after installation, repair or modification. Stub-outs, manhole boots and pipe plugs must be secured to prevent movement while the vocuum is drawn. Installation and operation of woman equipment and indicating devices must be in been provided by the in- nucturer and acceptable to the Engineer. With the vacuum testa ... is place:

| • | structure. | is to effect a seal between the vacuum trase and the |
|----|-------------------------------------|--|
| ₹. | Connect the vocuum p, to the out | let nort with the volve onen |
| 5. | Drow a vocuum 10° of i. und dose | the volve. |
| - | Acceptance standards I will | be established from the elapsed time for a negative |
| | pressure change from L. (10) inches | to nine (9) inches of mercury. The maximum allowable manhole must be in accordance with use following: |
| | Manhole Deoth | Minimum Elopsed Lime for a |
| | mainine popul | Pressure Change of 1 Inch HG |

60 seconds

| | >15 feet but @5t | 90 seconds |
|----|---|---|
| | in diameter, and an od 30 second | on additional 15 seconds and for multiples six feet s to the time requirements for four-toot diameter 25 feet, Engineer will determine the applicable |
| F. | If the manhole fails the tast, necessary names be repeated until the manhole pass | spairs must be made and the vacuum test and repairs |
| Ģ. | If manhole joints are punctions the Joints replaced. | e vacuum test, the manhole must ic disassembled |
| H. | Manholes will be subject to visual inspectly | on with all visual looks being repaired. |
| | Closed Circuit Television (, within) | |

10 ft or less

>10 feet but <15 test

A. Sections of sewers will b. ...pected at Engineer's discretion by closed circuit television. All television inspections must be performed in a manner acceptable to the Engister. The contractor must furnish all equipment, and a qualified television technicism a trained supervisor, and sufficient; assumed to perform all the work required in the in-, ection The contractor must furning space corneros and related equipment to prevent adays due to equipment breakdowns. must be equipped with remote-control focusing devices, remote-control devices the light intensity, and enough coble must :. furnished to

inspect 1,000 lineal feet in a continuous operation. The corners must be small enough to pass through the inch opening. The contractor must classified sever, where required, one section at a time. After the sewer is cleaned, the television using must be attached to the end of a cable so that it can be pulled through the piec :... Inc comero must trail a line of steel cable which will be necessory.

- The corners must transmit a continuous color image to the color television monitor. This image must be clear and sharp enough to enable those viewing the monitor to be able to easily see the interior condition of the pipe line being inspected. A continuous distance log. zeroed at the starting manhole, must be displayed on the monitor at all times. For each television inspection unit being used, the contractor must provide a mobile airconditioned viewing room large enough to accommodate at least three people for the purpose of viewing the monitor while the inspection is in progress. Minimum size of the monitors will be 17 inches, measured diagonally across the viewing screen.
- The contractor must humish all equipment required for making a continuous VHS video tapo of the view which appears on the manitor. The Engineer must be present at all times during television inspection of the sewers and will

indicate to the contractor whatever data is required to be logged and prepared for record

purposes. The contractor must prepare and furnish to Engineer and the Subscriber not less

- than two copies of the final record, video tape, and report of all inspection work done. PART 4 - OPERATION, CLEANING AND FINAL INSPECTION OF SEWERS PRIOR TO
- No person, including but not limited to Subscribers, maintenance workers, contractors, subcontractors and engineers shall, directly or indirectly, allow flow to occur from any Project which is not Complete to a Completed Project.
- The Project must be cleaned as directed by Engineer by a jet-rodder with vactor truck at Subscriber's expense at least once prior to conveyance. This cleaning may be delayed for up to three years (with applicable security deposit) at HSE's discretion if all lots/facilities served by the Project are not developed and connected within three months prior to
- 5 Final Inspection Within six months prior to conveyance, an inspection ("Final Inspection") will be conducted at Subscriber's expense by a firm selected by HSE. The Final Inspection will consist of a walk—through and television inspection of the Project to Identify any defects. The Final inspection may also consist of flow manitoring, and smake, infiltration, exhibitation, vacuum deflection or low pressure oir tests as determined by Engineer. Subscriber will be notified of the date and time of the walk-through inspection and may attend the inspection.

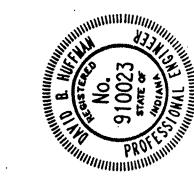
Subscriber must rectify defects prior to conveyance in a manner acceptable to Engineer.

These Specifications were last revised on January 1, 1998.

HAMILTON SOUTHEASTERN UTILITIES, INC. GRAVITY SANITARY SEWER **SPECIFICATIONS**

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displacement while United the pipe. An off supply line will contain an off-cent go resource and of the section. In apply line will contain an off-cent go where and of the section. In apply line will contain an off-cent go where and of pressure goage aring a range from 0 to 10 psi. The goage must have minimum divisions of 0.1 psi and a pressure goage and courage of the contain an off-cent go where minimum divisions of 0.1 psi and a pressure goage are on accuracy of the contain an off-cent go.

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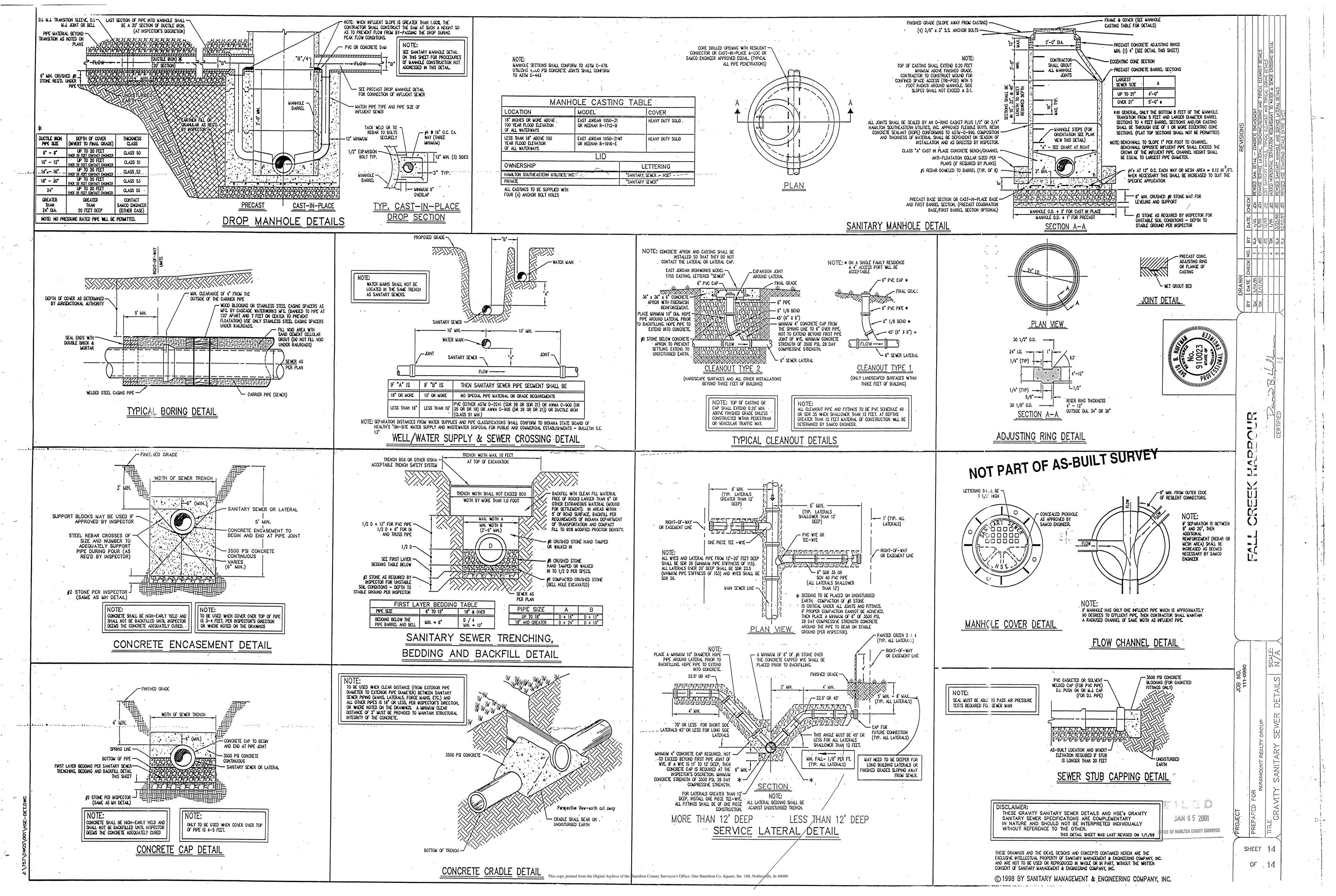
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Kenton C. Ward, CFM Surveyor of Hamilton County Phone (317) 776-8495 Fax (317) 776-9628 Suite 188 One Hamilton County Square Noblesville, Indiana 46060-2230

Map Correction-Field Verification

Drain: #298 Sail Place **Drain Length:** 202

Arm: Fall Creek Harbour Sec. 1 Change + / -: -40

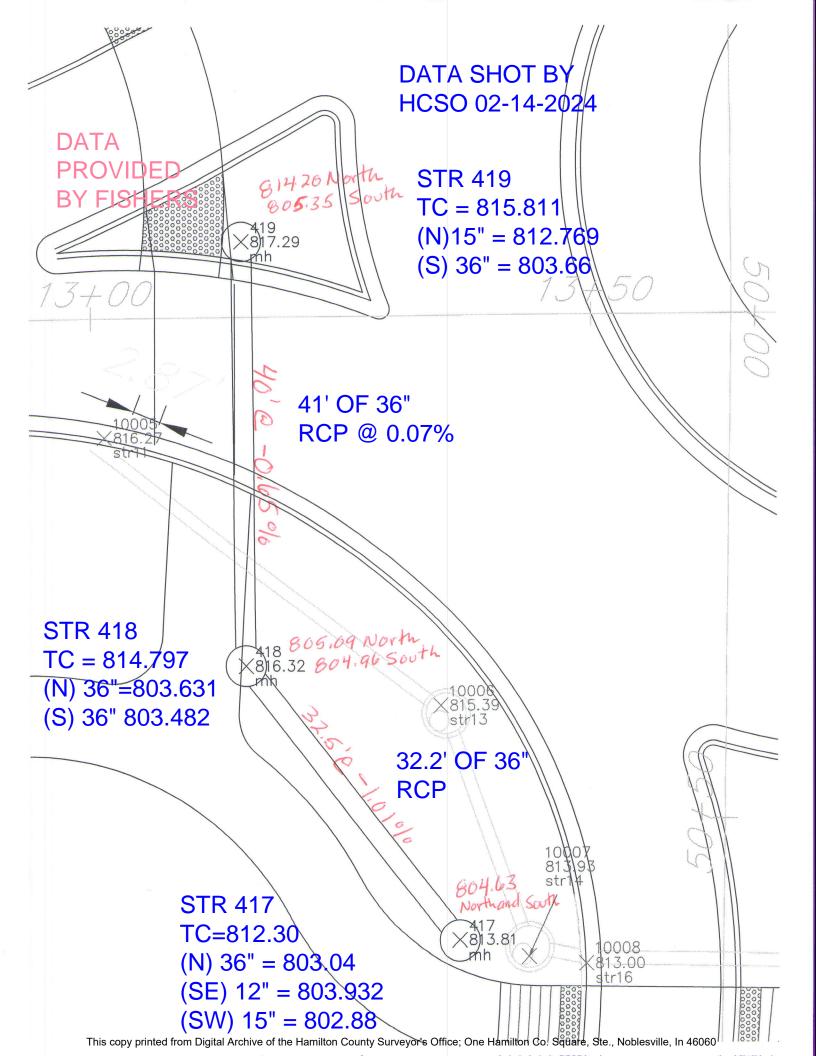
Verified By: Steve Fesmire

Notes & Sketch: See attached As-built Information.

The City of Fishers installed a roundabout at the intersection of Fall Creek Road and Brooks School Rd. This modified the existing drain by replacing 41 feet of 24" RCP with 41 feet of 36" RCP. The new pipe was installed between two new structures (419,418). The existing drain between existing structures 1 to 3 was abandoned in place. This consisted of 40 feet of 12" RCP.

Suzanne L. Mills GIS Specialist

Luyum S. Wills



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25 1707009 249277.1 815.811 nrim mh 419
26 1707009 249276.1 812.769 rcp 15in North
27 1707007 249276.7 803.666 rcp 36in South
28 1707036 249275.1 817.273 nrim North of project
29 1707033 249275.6 812.775 rcp_15in_South
30 1707034 249274.6 813.125 rcp 15in North
31 1707035 249276.4 812.862 rcp_12in_NE abandone
32 1707034 249275.7 812.852 str test for 12in
33 1707040 249254.2 817.201 nrim North of project
34 1707039 249254.8 813.327 rcp_15in_South
                                                   SE
35 1707040 249254 813.375 rcp 15in North
36 1707083 249236.5 821.593 nrim_North of project
37 1707082 249236.7 815.698 rcp_15in_South
38 1706967 249277.5 814.797 nrim mh 418
39 1706966 249277.1 803.631 rcp_36in_North
40 1706964 249277.7 803.482 rcp 36in South
41 1706939 249297.7 803.04 rcp 36in North
42 1706938 249297.2 802.88 rcp_15in_SW
43 1706937 249299 803.932 rcp 12in South
44 1706939 249298.5 812.3 nrim mh 417
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41 ft of 36 in rcp @ 0.07% slope between mh 419 & mh 418 32.2 ft of 36 in rcp @ 1.37% slope between mh 418 & mh 417