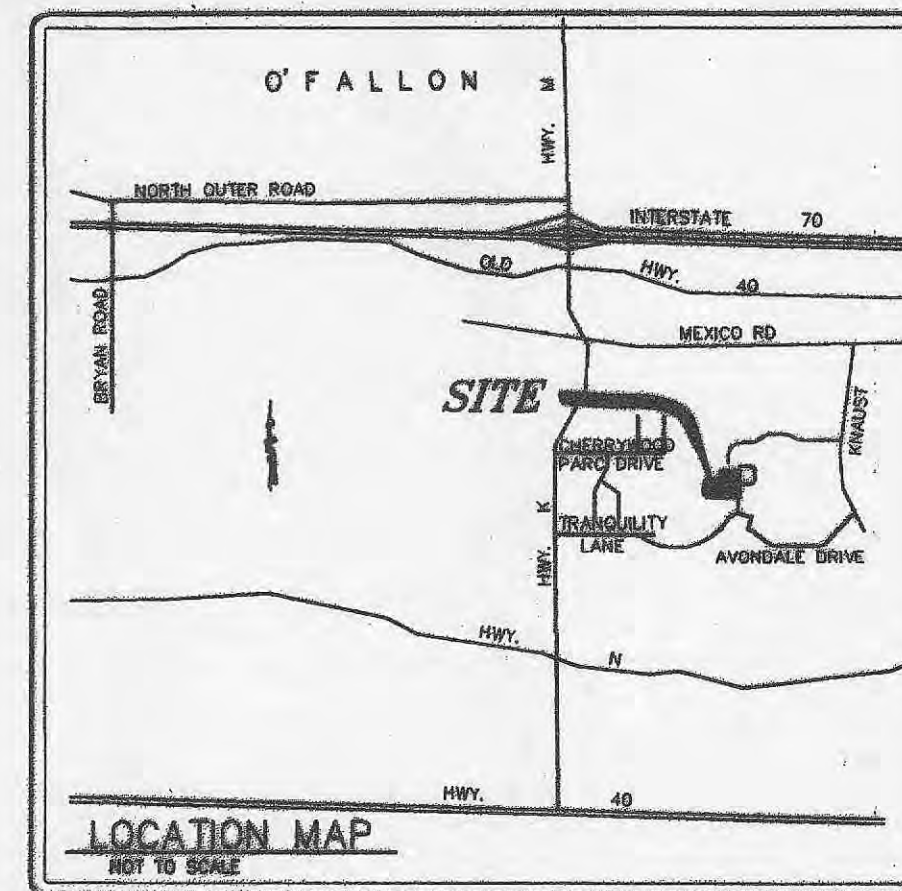


# SANITARY SEWER - STORM SEWER AND WATER AS-BUILTS

## PENNIAL PARK - PHASE 1 (NOW KNOWN AS AVONDALE HEIGHTS PLAT SIX AND PENNIAL PARK PLAT ONE)

A TRACT OF LAND BEING PART OF FRACTIONAL SECTION 4,  
TOWNSHIP 46 NORTH, RANGE 3 EAST  
OF THE FIFTH PRINCIPAL MERIDIAN,  
CITY OF O'FALLON, ST. CHARLES COUNTY, MISSOURI



### GRADING NOTES

- A Geotechnical Engineer shall be employed by the owner and be on site during grading operations. All soils tests shall be verified by the Geotechnical Engineer concurrent with the grading and backfilling operations.
- The grading contractor shall perform a complete grading and compaction operation as shown on the plans, stated in these notes, or reasonably implied therefrom, all in accordance with the plans and notes as interpreted by the Geotechnical Engineer.
- The Contractor shall notify the Soils Engineer at least two days in advance of the start of the grading operation.
- All areas shall be allowed to drain. All low points shall be provided with temporary ditches.
- A sediment control plan that includes monitored and maintained sediment control basins and/or straw bales should be implemented as soon as possible. No graded area is to be allowed to remain bare without being seeded and mulched. Care should be exercised to prevent soil from damaging adjacent property and siting up existing downstream storm drainage system.
- Debris and foundation material from any existing on-site building or structure which is scheduled to be razed for this development must be disposed of off-site.
- All trash and debris on site, either existing or from construction, must be removed and properly disposed of off-site.
- Soft soil in the bottom and banks of any existing or former pond sites or tributaries or on any sediment basins or traps should be removed, spread out and permitted to dry sufficiently to be used as fill. None of this material should be placed in proposed public right-of-way locations or on any storm sewer locations.
- Site preparation includes the clearance of all stumps, trees, bushes, shrubs, and weeds; the grubbing and removal of roots and other surface obstructions from the site; and the demolition and removal of any man-made structures. The material shall be properly disposed of off-site. Topsoil and grass in the fill areas shall be thoroughly disced prior to the placement of any fill. The Soils Engineer shall approve the discing operation.
- Compaction equipment shall consist of tamping rollers, pneumatic-tired rollers, vibratory roller, or high speed impact type drum rollers acceptable to the Soils Engineer. The roller shall be designed so as to avoid the creation of a layered fill without proper blending of successive fill layers.
- The Soils Engineer shall observe and test the placement of the fill to verify that specifications are met. A series of fill density tests will be determined on each lift of fill. Interim reports showing fill quality will be made to the Owner at regular intervals.
- The Soils Engineer shall notify the Contractor of rejection of a lift of fill or portion thereof. The Contractor shall rework the rejected portion of fill and obtain notification from the Soils Engineer of its acceptance prior to the placement of additional fill.
- All areas to receive fill shall be scarified to a depth of not less than 8 inches and then compacted in accordance with the specifications given below. Natural slopes steeper than 1 vertical to 5 horizontal to receive fill shall have horizontal benches, cut into the slopes before the placement of any fill. The width and height to be determined by the Soils Engineer. The fill shall be loosely placed in horizontal layers not exceeding 8 inches in thickness and compacted in accordance with the specifications given below. The Soils Engineer shall be responsible for determining the acceptability of soils placed. Any unacceptable soils placed shall be removed at the Contractor's expense.
- The sequence of operation in the fill areas will be fill, compact, verify acceptable soil density, and repetition of the sequence. The acceptable moisture contents during the filling operation are those at which satisfactory dry densities can be obtained. The acceptable moisture contents during the filling operation in the remaining areas are from 2 to 8 percent above the optimum moisture control.
- The surface of the fill shall be finished so that it will not impound water. If at the end of a days work it would appear that there may be rain prior to the next working day, the surface shall be finished smooth. If the surface has been finished smooth for any reason, it shall be scarified before proceeding with the placement of succeeding lifts. Fill shall not be placed on frozen ground, nor shall filling operations continue when the temperature is such as to permit the layer under placement to freeze.
- Fill and backfill should be compacted to the criteria specified in the following table:

CATEGORY	MINIMUM PERCENT COMPACTION
Fill in building areas below footings	90%
Fill under slabs, walks, and pavement	90%
Fill other than building areas	88%
Natural subgrade	88%
Pavement subgrade	90%
Pavement base course	90%

Measured as a percent of the maximum dry density as determined by modified Proctor Test (ASTM-D-1557).

Moisture content must be within 2 percent below or 4 percent above optimum moisture content if fill is deeper than 10 feet.

### GENERAL NOTES

- Underground utilities have been plotted from available information and therefore their locations shall be considered approximate only. The verification of the location of all underground utilities, either shown or not shown on these plans shall be the responsibility of the contractor, and shall be located prior to any grading or construction of the improvements.
- All manhole tops & flowlines built without elevations furnished by the Engineer will be the responsibility of the sewer contractor.
- 8" P.V.C. sanitary sewer pipe shall meet the following standards. A.S.T.M.-D-3034 SDR-35, with wall thickness compression joint A.S.T.M.-D-3212. An appropriate rubber seal waterstop as approved by the sewer district shall be installed between P.V.C. pipe and masonry structures.
- All filled places, including trench backfills, under buildings, proposed storm and sanitary sewer lines and/or paved areas, shall be compacted to 90% maximum density as determined by the "Modified AASHTO T-180 Compaction Test," (A.S.T.M.-D-1557). All other trench backfills may be earth material (free of large clods or stones). All trench backfills shall be water jetted.
- All trench backfills under paved areas shall be granular backfill, and shall be compacted to 90% of the maximum density as determined by the "Modified AASHTO T-180 Compaction Test," (A.S.T.M.-D-1557). All other trench backfills may be earth material (free of large clods or stones). All trench backfills shall be water jetted.
- All sanitary house connections have been designed so that the minimum vertical distance from the low point of the basement to the flow line of a sanitary sewer at the corresponding house connection is not less than the diameter of the pipe plus the vertical distance of 2 1/2 feet.
- No area shall be cleared without the permission of the Project Engineer.
- All P.V.C. sanitary sewer is to be SDR-35 or equal with clean 1/2" to 1" granular stone bedding uniformly graded. This bedding shall extend from 4" below the pipe to the springline of the pipe. Immediate backfill over pipe shall consist of same size "clean" or minus stone from springline of pipe to 6" above the top of pipe.
- All soils test shall be verified by the Soils Engineer concurrent with the grading and backfilling operations.
- Easements shall be provided for sanitary sewers, and all utilities on the Record Plat. See Record Plat for location and size of easements.
- Maintenance and upkeep of the common ground area shall be the responsibility of the developer and/or successors.
- A 25' building line shall be established along all Public Rights-Of-Way.
- All water lines shall be laid at least 10 feet horizontally, from any sanitary sewer, storm sewer, or manhole, 18" vertical clearance from outside of pipe to outside of pipe shall be maintained whenever water lines must cross sanitary sewers, laterals, or storm drains the water line shall be laid at such an elevation that the bottom of the water line is above the top of the drain or sewer. A full length of water pipe shall be centered over the sewer line to be crossed so that the joints will be equally distant from the sewer and as remote therefrom as possible. This vertical separation shall be maintained for that portion of the water line located within 10 feet horizontally, of any sewer or drain it crosses.
- All PVC water pipe shall conform to A.S.T.M.-D-2241, SDR 21 Standard Specification for P.V.C. Pressure Pipe, 200 P.S.I. working pressure for water, with approved joint.
- Water lines, valves, sleeves, meters, and fittings shall meet all specifications and installation requirements of Public Water Supply District No. 2 of St. Charles County.
- All water hydrants and valves shall be ductile iron and installed in accordance with plans and details. All ductile iron pipe for water mains shall conform to A.W.W.A. Specifications C-106 and/or C-108. The ductile iron fittings shall conform to A.W.W.A. Specification CC-110. All rubber gasket joints for water ductile iron pressure pipe and fittings shall conform to A.W.W.A. Specification C-111.
- All sanitary manholes shall be waterproofed on the exterior in accordance with Missouri Department of Natural Resources specifications 10 CSR-8.120 (7)E.
- Brick will not be used in the construction of sanitary sewer manholes.
- All pipes shall have positive drainage through manholes. No flat base structures are allowed.
- The City of O'Fallon and Duck Creek Sanitary District shall be notified 48 hours prior to construction for coordination and inspection.
- Gas, water and other underground utilities shall not conflict with the depth or horizontal location of existing or proposed sanitary or storm sewers, including house laterals.
- All existing site improvements disturbed, damaged or destroyed shall be repaired or replaced to closely match pre-construction conditions.
- The contractor shall prevent all storm, surface water, mud and construction debris from entering the existing sanitary sewer system.
- All construction and materials shall conform to the current construction standards of the City of O'Fallon and Duck Creek Sanitary District.
- All sanitary and storm sewer trench backfills shall be water jetted. Granular backfill will be used under pavement areas.
- All existing areas disturbed during construction of the off-site sanitary sewer line shall be seeded and mulched to prevent erosion.
- All sanitary sewer laterals shall be a minimum of 4" in diameter per City of O'Fallon.
- No flushing hydrants or water meters shall be located in driveways and or walkways.
- Concrete pipe for storm sewers shall be Class III, A.S.T.M. C-76 with a minimum diameter of 12" except in the R.O.W. it shall be 15".
- The ADS N-12 pipe shall have a smooth interior wall.
- Concrete pipe joints shall be MSD type "A" approved compression-type joints and shall conform to the requirements of the specifications for circular concrete sewer and culvert pipe, using flexible, watertight, rubber-type gaskets (A.S.T.M.-C-443). Band-type gaskets depending entirely on cement for adhesion and resistance to displacement during jointing shall not be used.
- When HDPE pipe is used, City of O'Fallon specifications or manufacturers specifications, which ever are more stringent, shall be followed.
- The use of High Density Polyethylene Corrugated pipe, ADS N-12 or equal will be permitted as an acceptable alternative to reinforced concrete pipe, ADS N-12 HC shall be used for all ADS pipe greater than 36". Pipe shall meet A.S.T.M.-D-2321 and A.A.S.H.T.O. M-294-291.
- All flared end sections and inlet structures will be concrete.
- All storm sewer pipe installed in the Public Right-of-Way shall be Reinforced concrete Class III pipe.
- All concrete pipe or ADS N-12 pipe shall be installed with "O-Ring" Rubber type gaskets per M.S.D. standard construction specifications or manufacturer.
- All Fire Hydrants and Water Meters shall not be located in driveways and/or sidewalks.
- All creek crossings shall be grouted rip-rap as directed by District inspectors. (All grout shall be high slump ready-mix concrete.)
- Existing sanitary sewer service shall not be interrupted.
- Pre-manufactured adapters shall be used of all PVC to DIP connections. Rubber boot / Mission-type couplings will not be allowed.
- Any permits, licenses, easements, or approvals required to work on public or private properties or roadways are the responsibility of the developer.
- No slopes shall exceed 3(H) : 1(V).
- Driveway locations shall not interfere with the sidewalk handicap ramps in the cul-de-sacs.

### DEVELOPMENT NOTES

- Area of Tract: 25.08 Acres
- Existing Zoning: R-1 (City of O'Fallon)
- Proposed Use: Single Family Homes
- Number of Lots Proposed: 73 Lots
- The proposed height and lot setbacks are as follows:  
Minimum Front Yard: 25 feet  
Minimum Side Yard: 6 feet  
Minimum Rear Yard: 25 feet  
Minimum Lot Area: 10,000 square feet  
Maximum Height of Building: 2 1/2 stories or 35 feet  
Kaplan Development Company  
5140 North Service Road  
St. Peters, MO 63376
- Site is served by: Duckett Creek Sanitary District  
AmerenUE  
St. Charles Gas Company  
St. Charles County Public Water District No. 2  
OTE Telephone Company  
Fort Zumwalt School District  
O'Fallon Fire Protection District
- No Flood Plain exists on this site per F.I.R.M. #29183 C 0243E, dated Aug. 2, 1996.
- Topographic information is per Walker and Associates Topo on U.S.G.S. Datum.
- Boundary information is per Box Engineering during August, 1999.
- All streets will be constructed to City of O'Fallon standards. Streets will consist of 26 foot wide concrete pavement with integral rolled curb centered in a 50 foot right-of-way. With exception to Fallon Parkway which will consist of 36 foot wide concrete pavement with integral rolled curb centered in a 60 foot right-of-way. Minimum radius shall be 150 feet.
- All cul-de-sacs and bubbles will have pavement radii of 42 feet with right-of-way radii of 54 feet. Street intersections shall have a minimum rounding radius of 25 feet with pavement radii of 37 feet.
- Minimum street grades shall be 1%.
- A 4 foot wide concrete sidewalk shall be constructed on one side of streets where indicated.
- All homes shall have a minimum of 2 off-street parking places with 2-car garages.
- All utilities must be located underground.
- The following lots are susceptible to street movement:  
6-9, 15-24, 107, 125, 126, 144-149, 153-156, 162
- Calculations in accordance to the Tree Preservation Ordinance:  
Existing trees 8.28 acres  
Saved trees 0.00 acres  
Trees to be Replaced 8.28 x 15 = 124 trees  
Landscape Req'd (1 per 50' frontage) 13,786' 276 trees  
Total Required for entire site 276 + 124 = 400 trees

### SHEET INDEX

1	COVER SHEET
2-3	SITE PLANS
4-6	SANITARY SEWER PROFILES
7-10	STORM SEWER PROFILES

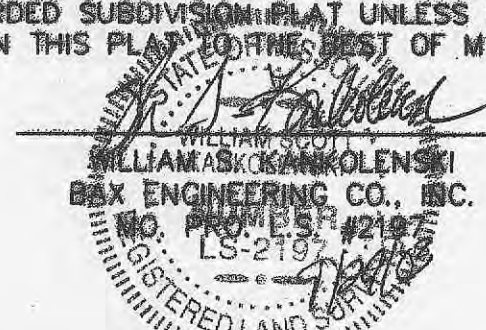
### REFERENCE BENCHMARK

R.M. #74 - ELEV.=493.07 (U.S.G.S. DATUM)  
CHISELED SQUARE ON TOP OF EAST CONCRETE HEADWALL  
OF BIRDIE HILLS ROAD BRIDGE OVER TRIBUTARY NO. 2  
(APPROXIMATELY 500 FEET SOUTH OF EISENHOWER DRIVE)

### SITE BENCHMARK

ELEV.=572.28 (U.S.G.S. DATUM)  
OLD CROSS CL-CL SHEETWAY DRIVE AND  
CHERRYWOOD PARK DRIVE  
CHERRYWOOD PARK SUBDIVISION

THIS IS TO CERTIFY THAT WE HAVE DURING THE MONTH OF AUGUST, 2001, BY ORDER OF KAPLAN DEVELOPMENT CO., EXECUTED AN AS-BUILT SURVEY OF EXISTING SANITARY SEWERS, STORM SEWERS, FIRE HYDRANTS AND WATER VALVES WITHIN "PENNIAL PARK PHASE ONE", A SUBDIVISION ACCORDING TO THE PLAT THEREOF RECORDED IN PLAT BOOK \_\_\_\_\_ PAGE \_\_\_\_\_ OF THE ST. CHARLES COUNTY RECORDS. THE SANITARY LATERALS THAT ARE SHOWN WERE TAKEN FROM INFORMATION SUPPLIED TO BAX ENGINEERING BY THE SEWER CONTRACTOR, THEREFORE THEIR LOCATION IS ASSUMED APPROXIMATE. ALL SEWERS SHOWN ARE WITHIN THE EASEMENTS AS SHOWN ON SAID RECORDED SUBDIVISION PLAT UNLESS OTHERWISE NOTED. THE RESULTS OF THIS AS-BUILT SURVEY ARE SHOWN ON THIS PLAT TO THE BEST OF MY KNOWLEDGE AND BELIEF.



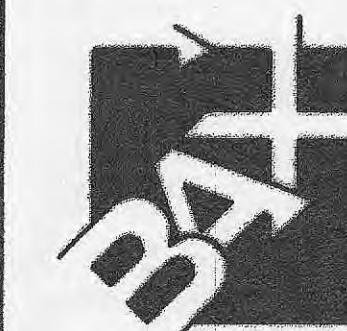
**PENNIAL PARK PHASE 1-PLAT ONE**  
 KAPLAN DEVELOPMENT COMPANY  
 5140 NORTH SERVICE ROAD  
 ST. PETERS, MISSOURI 63376  
 (636) 397-4471

RECEIVED  
MAR 27 2008

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Box Engineering Company, Inc.  
All Rights Reserved

### REVISIONS

DATE	REV.	PER	COMMENTS
7/25/00	Rev.	Per	Comments
9/12/00	Rev.	Per	Comments
9/26/00	Duckett Creek		
12/12/00	Revise	Plat Limits	



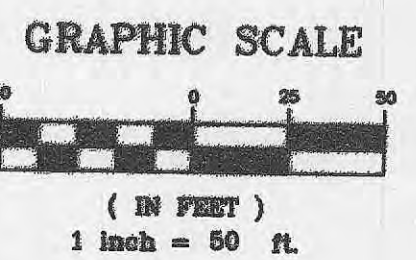
**ENGINEERING  
PLANNING  
SURVEYING**

1082 South Cloverleaf Drive  
St. Peters, MO. 63376-6446  
314-988-5652  
FAX 988-1716

AUG. 2001  
DATE  
96-8791  
PROJECT NUMBER  
1 of 10  
SHEET OF  
8791asbtscoy  
FILE NAME  
DJS WSK  
DRAWN CHECKED

AS-BUILT SITE PLAN  
**PENNIAL PARK  
 PHASE 1**

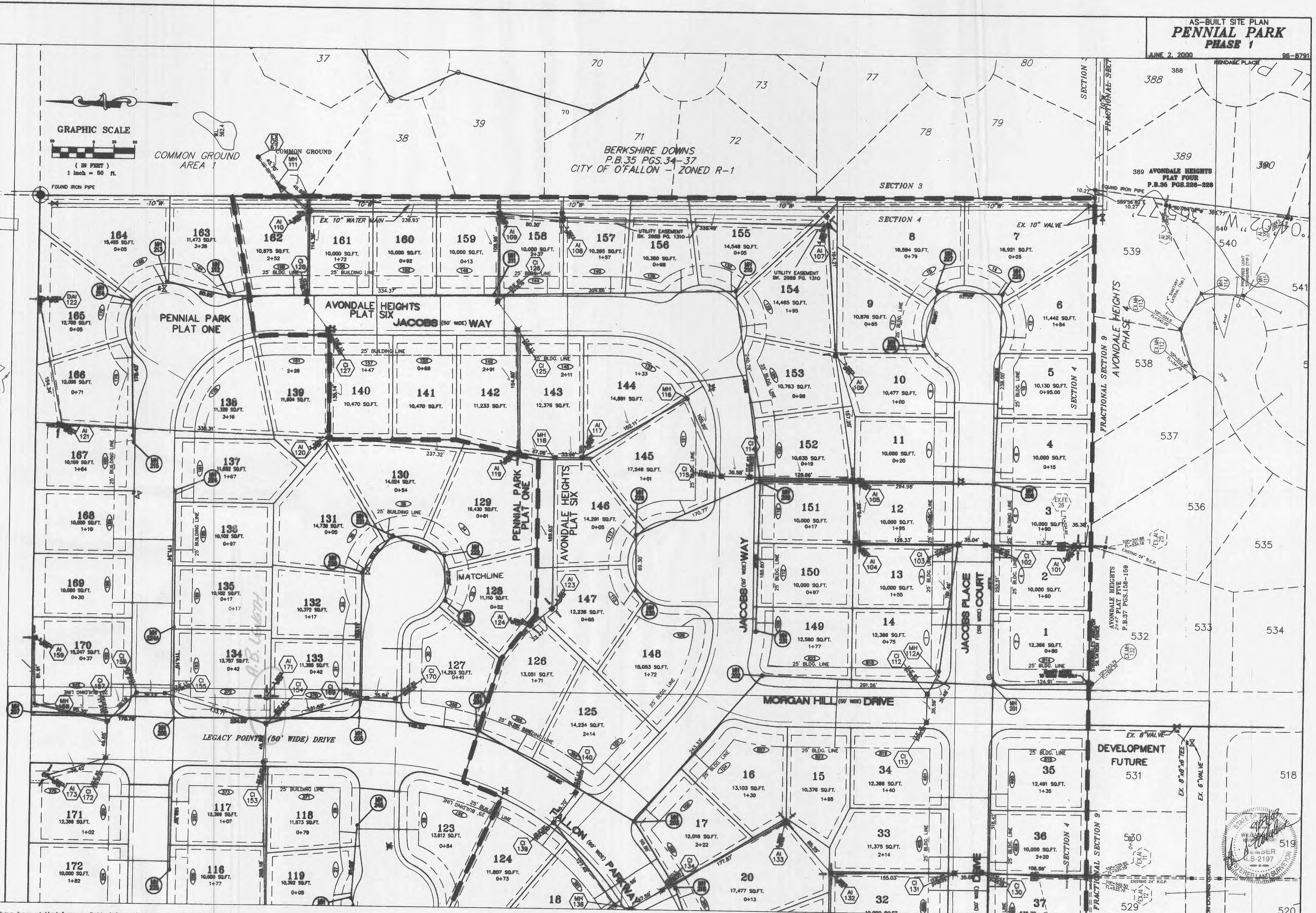
JUNE 2, 2000 96-8791



COMMON GROUND  
 AREA 1

BERKSHIRE DOWNS  
 P.B. 35 PGS. 34-37  
 CITY OF O'FALLON - ZONED R-1

PROPERTY N/T  
 WILLIAM & JOAN SCHNEIDER  
 707/1069



Underground utilities have been plotted from available information and, therefore, their locations shall be considered approximate only. The verification of the location of all underground utilities, either shown or not shown, on these plans shall be the responsibility of the Contractor, and shall be located prior to any grading or construction of the improvements.

**SEE SHEET 3**

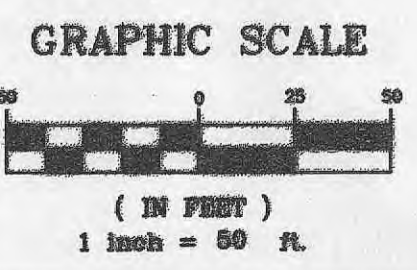
AS-BUILTS ADDED - AUGUST, 2001

# SEE SHEET 2

## AS-BUILT SITE PLAN PENNIAL PARK PHASE 1

JUNE 2, 2000

96-8791



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AS-BUILTS ADDED - AUGUST, 2001

Revised 7-25-00  
 Revised 9-12-00  
 Revised 12-12-00  
 Revised Crossings 2-07-01  
 Revised for D.C.S.D. Submittal 4-25-01  
 Revised 5-18-01

SANITARY PROFILES  
**PENNIAL PARK**  
**PHASE I**  
 June 2, 2000 96-6791

SCALES:  
 1" = 50' HORIZONTAL  
 1" = 10' VERTICAL

PENNIAL PARK PLAT TWO

PENNIAL PARK PLAT ONE

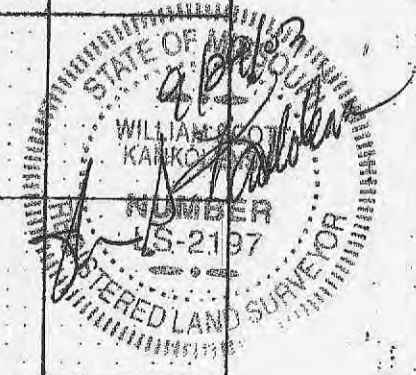


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These engineering plans have been prepared at the request of the developer for construction with some rock data, but not sufficient enough to determine the exact location of all existing rock conditions.

If existing rock conditions are encountered during construction it shall be the responsibility of the developer and/or his contractor to contact Box Engineering Co., Inc. and the soils engineer for the project at the time of encounter to determine the best design to continue construction.

NOTE: All Sanitary Sewer Lateral Tailstock elevations have been designed for an 8.0' basement pour in homes with the Top of Foundation elevation being set 2.5' above the Top of Curb elevation of the driveway.



4/10

AS-BUILTS ADDED AUGUST, 2001

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Revised 7-25-00  
 Revised 9-12-00  
 Revised 12-12-00  
 Submitted 4-23-01  
 Revised 5-18-01

SANITARY PROFILES  
**PENNIAL PARK**  
 PHASE 1

June 2, 2000  
 SCALES:  
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 1"=10' VERTICAL

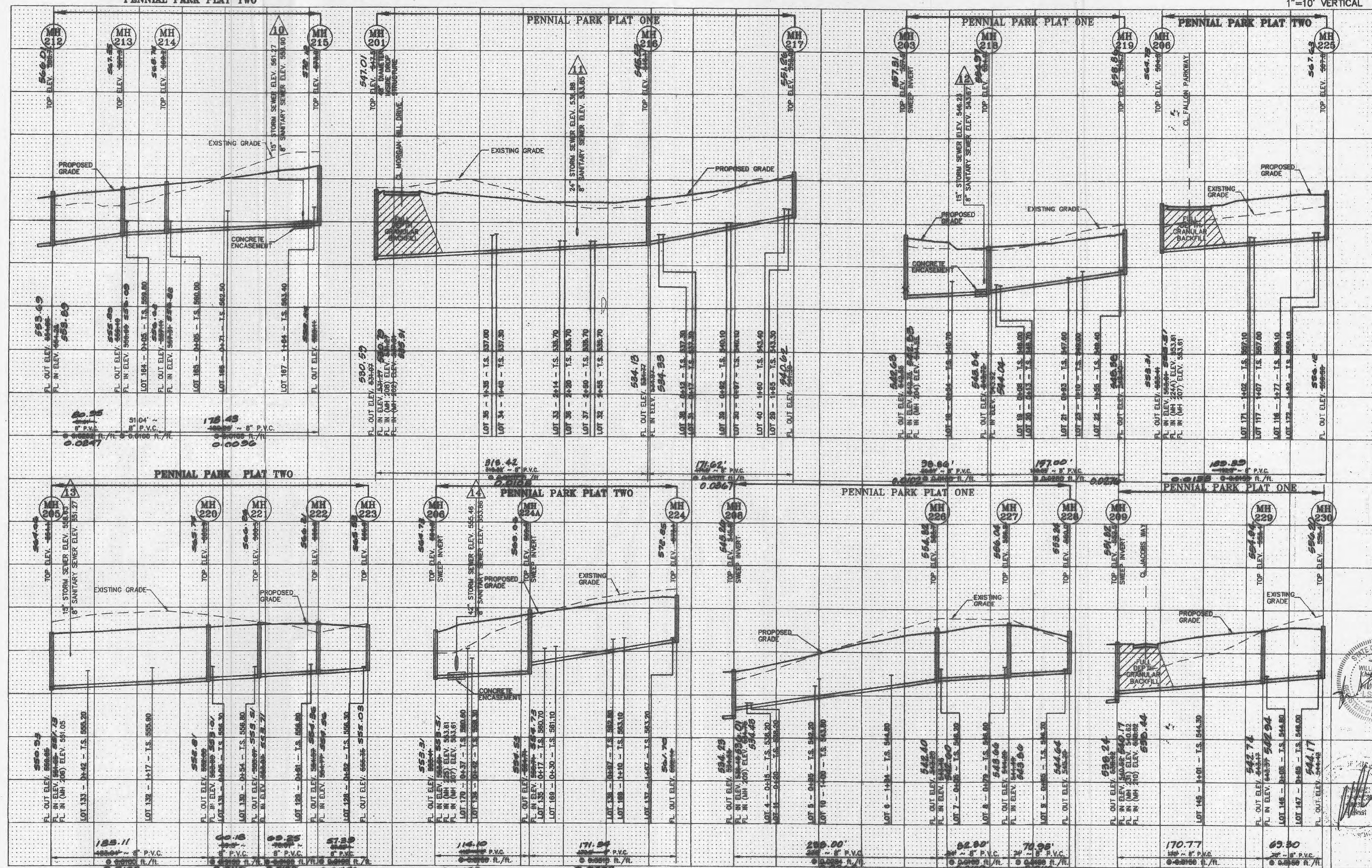
96-8791

PENNIAL PARK PLAT TWO

PENNIAL PARK PLAT ONE

PENNIAL PARK PLAT ONE

PENNIAL PARK PLAT TWO

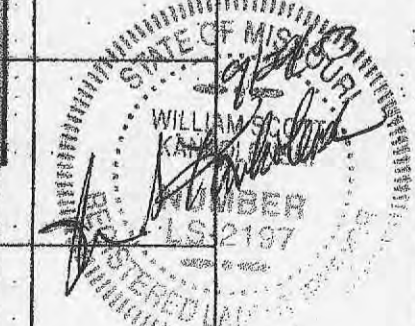


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NOTE:  
 All Sanitary Sewer Lateral Take elevations have been designed for an 8.0' basement floor in homes with the Top of Foundation elevation being set 2.5' above the Top of Curb elevation at the driveway.



5/10

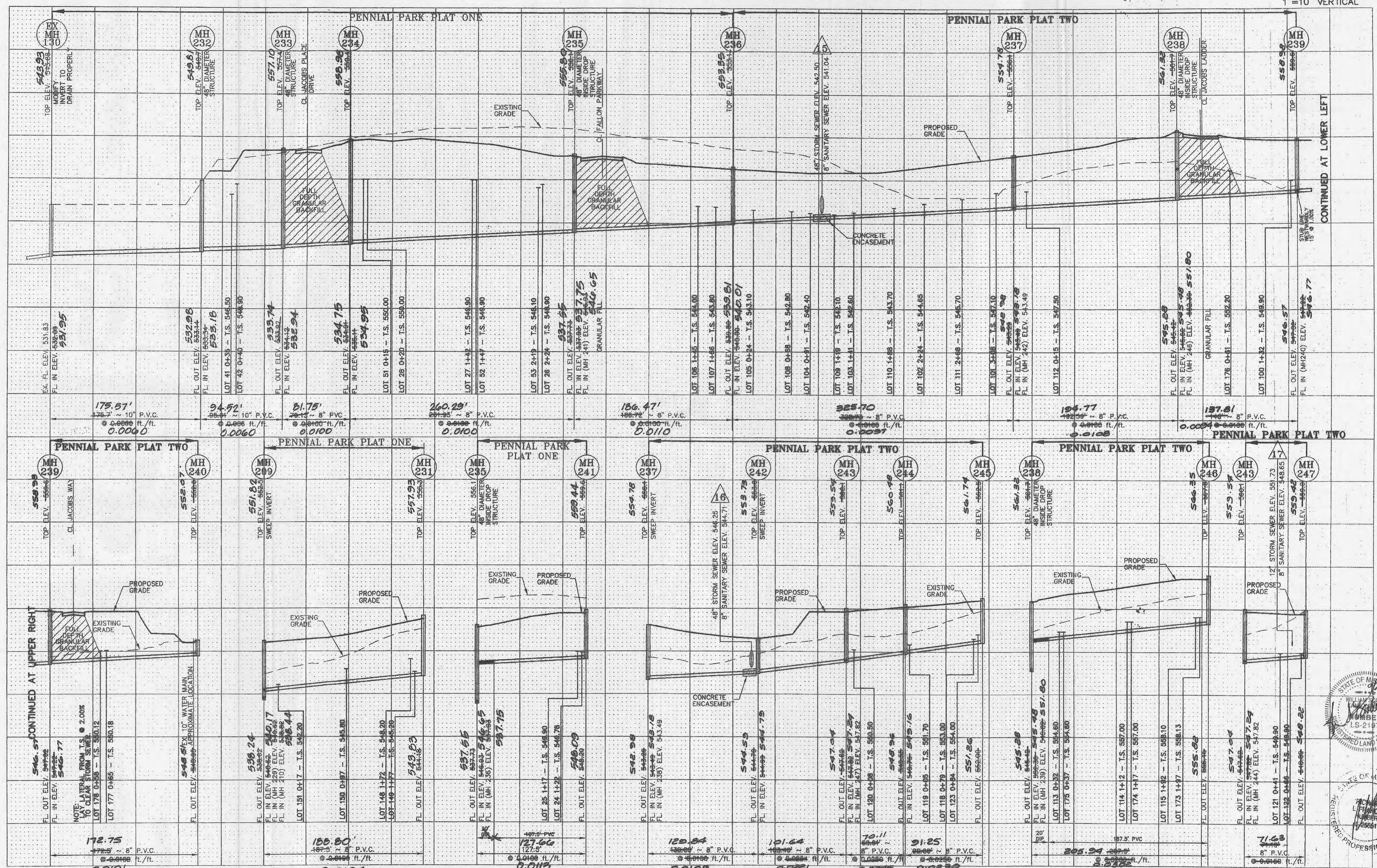
15-BUILTS ADDED AUGUST, 2001

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Revised 7-25-00  
 Revised 9-12-00  
 Submitted 4-25-01  
 Revised 5-18-01

**SANITARY PROFILES**  
**PENNIAL PARK**  
**PHASE 1**

June 2, 2000  
 SCALES:  
 1" = 50' HORIZONTAL  
 1" = 10' VERTICAL

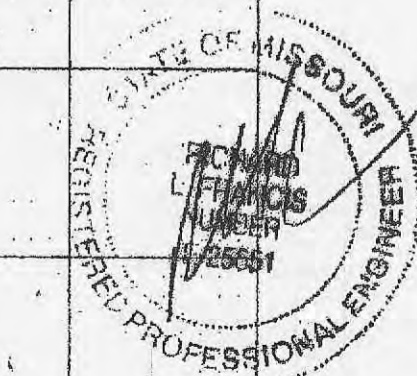
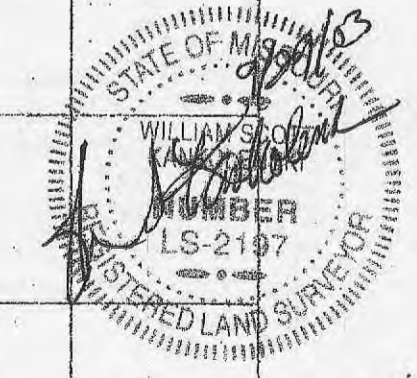


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6/10

**AS-BUILTS ADDED AUGUST, 2001**

Revised 7-25-00  
 Revised 9-12-00  
 Revised 1-04-01  
 Revised 2-07-01

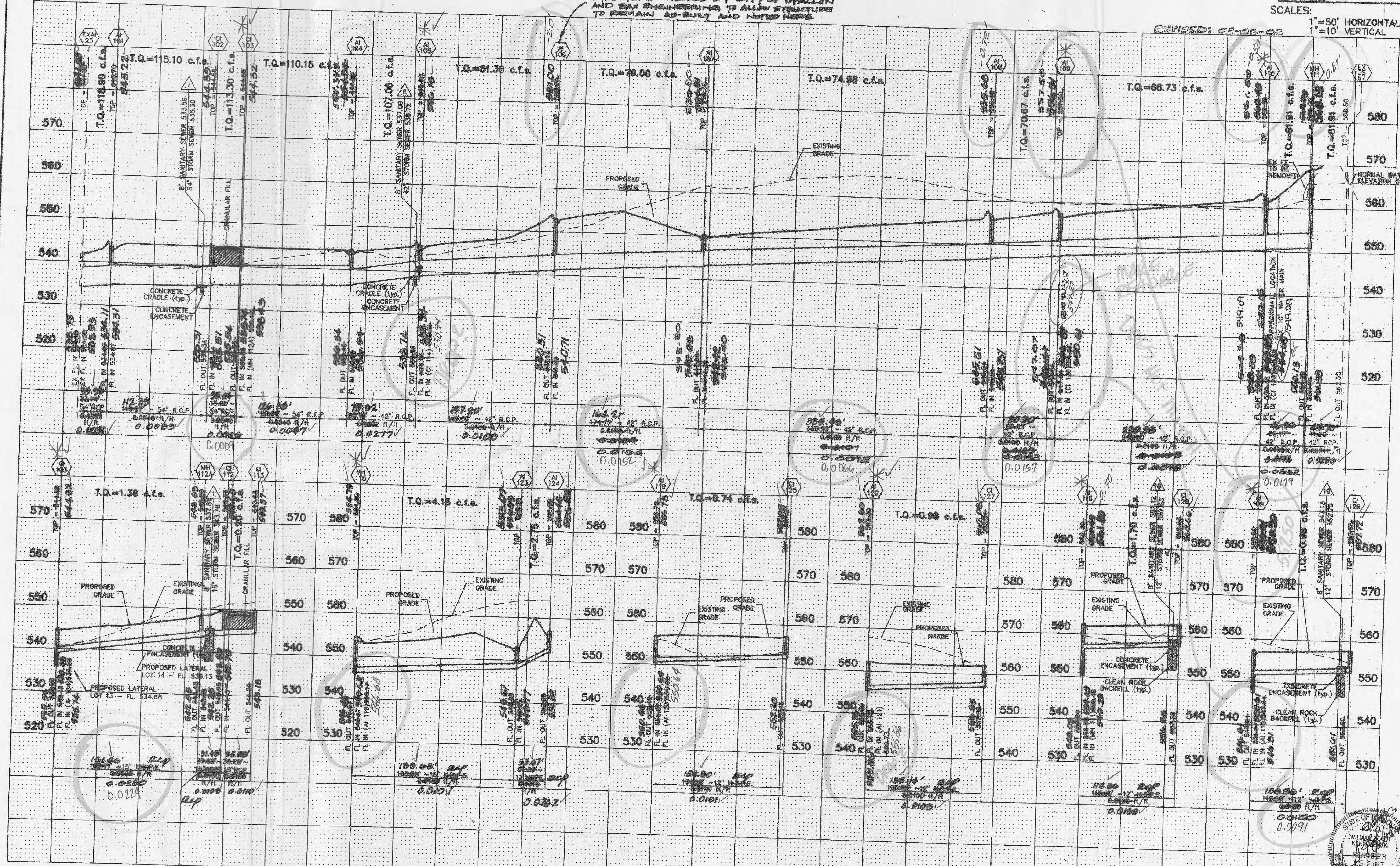
**STORM SEWER PROFILES**  
**PENNIAL PARK**  
**PHASE 1**

June 2, 2000 96-8791

SCALES:  
 1"=50' HORIZONTAL  
 1"=10' VERTICAL

STRUCTURE CHECKED BY CITY OF FALLON  
 AND BAX ENGINEERING TO ALLOW STRUCTURE  
 TO REMAIN AS-BUILT AND NOTED HERE.

REVISED: 02-02-02

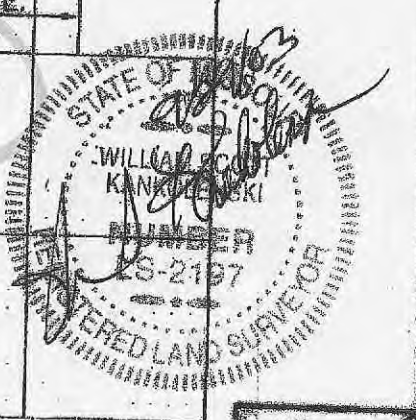


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**AS-BUILTS ADDED - AUGUST, 2001**



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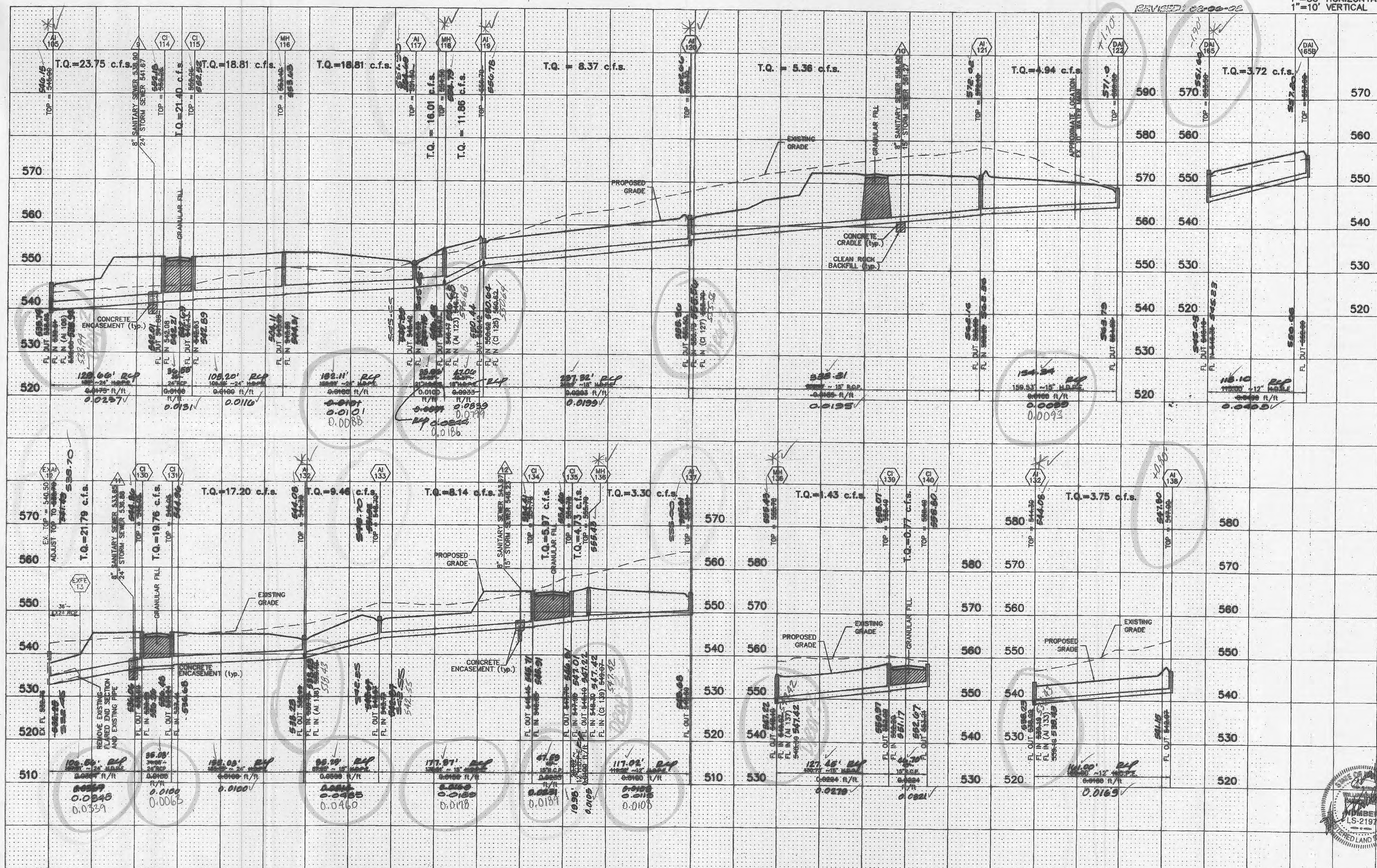
7/10

Revised 7-25-00  
 Revised 9-12-00  
 Revised 1-04-01  
 Revised 2-07-01  
 Revised 5-21-01

STORM SEWER PROFILES  
**PENNIAL PARK**  
 PHASE I

June 2, 2000 96-879

SCALES:  
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 1"=10' VERTICAL



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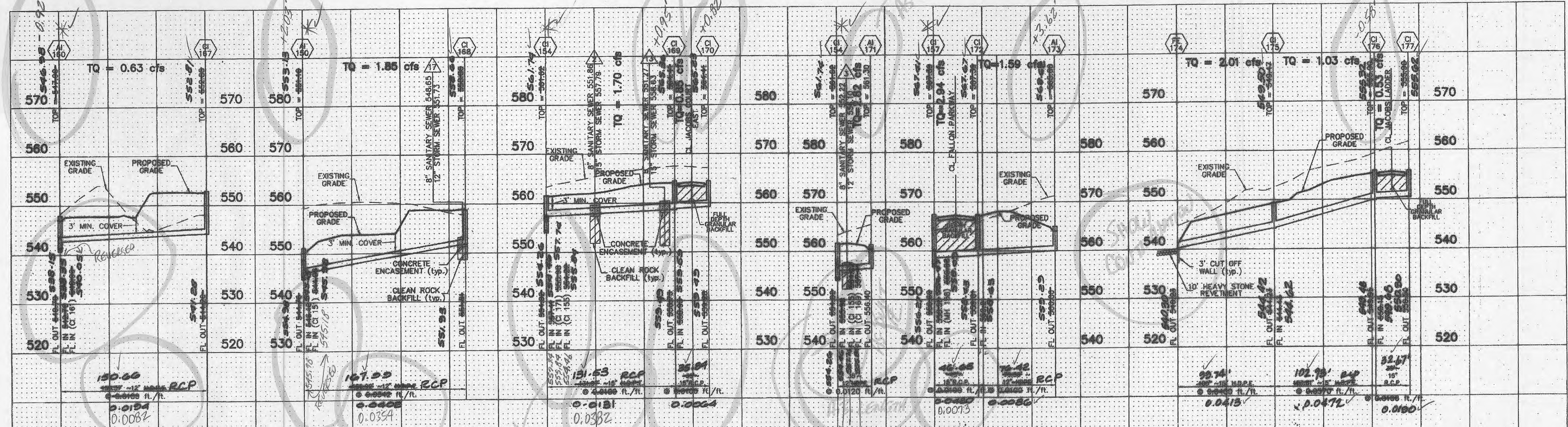
**AS-BUILTS ADDED - AUGUST, 2001**



8/10

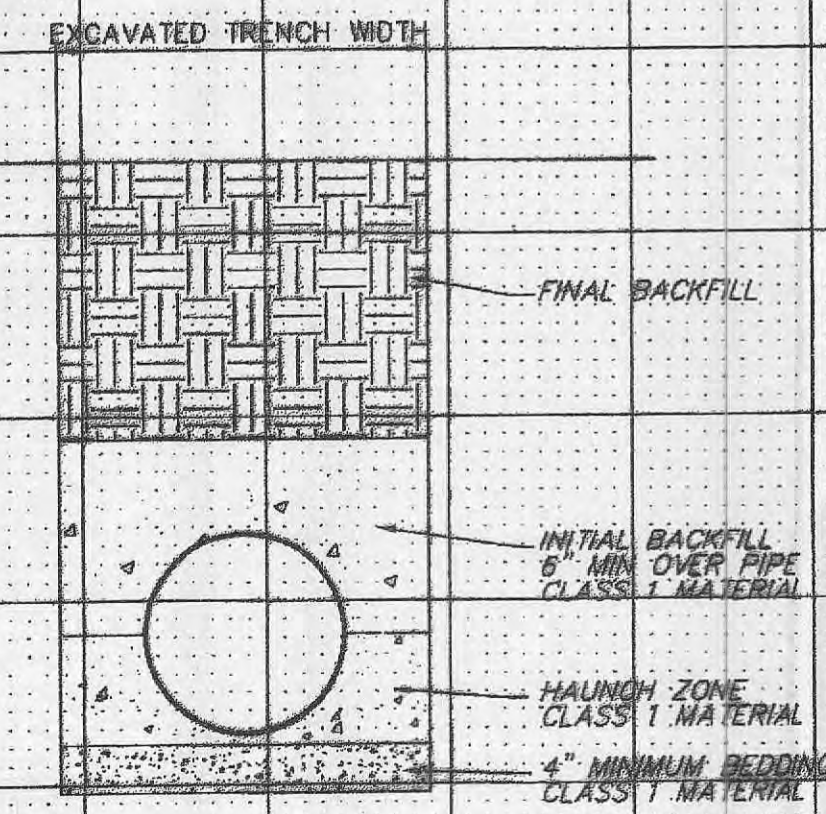


SCALES:  
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 1" = 10' VERTICAL

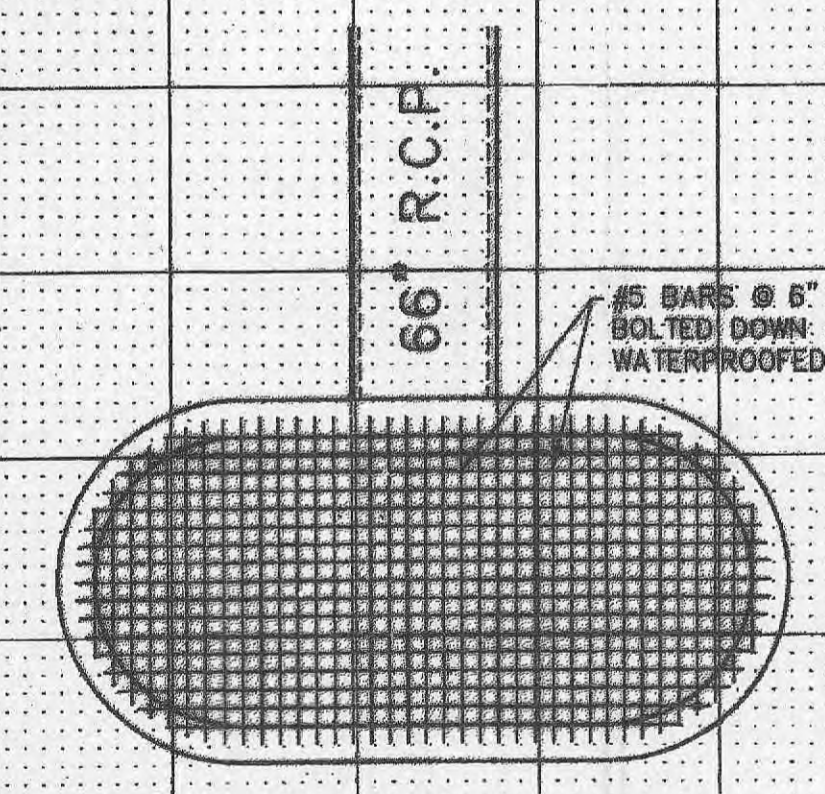
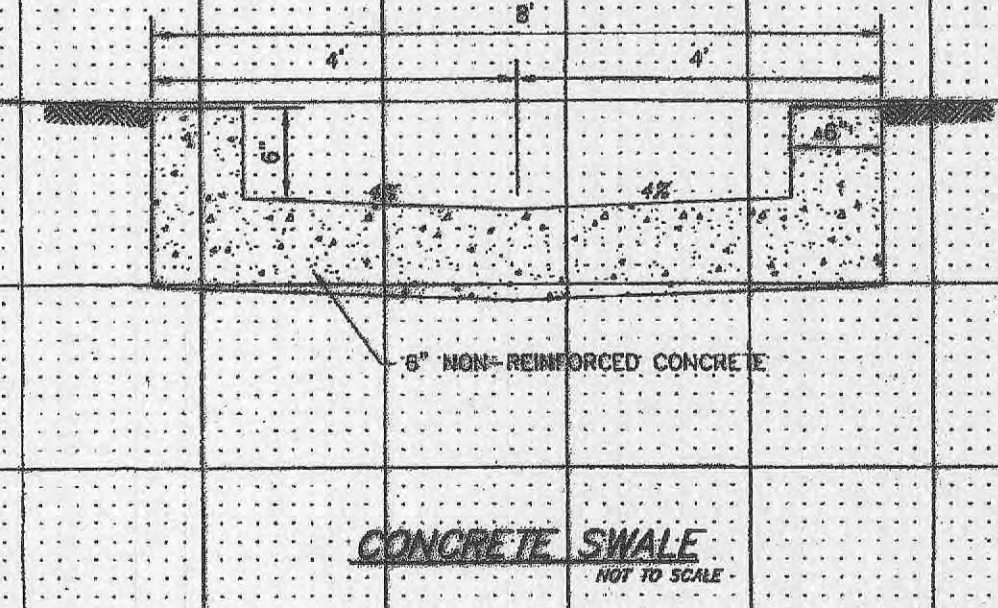


NOTE  
 All storm inlets shall be installed with 5/8 inch trash bar.

**H.D.P.E. PIPE DETAIL**



- The use of High Density Polyethylene Corrugated pipe (A.D.S. R12 or Equal) will be permitted as an acceptable alternative to reinforced concrete pipe. Pipe shall meet A.S.T.M. D-2321 and AASHTO M-294-921. Concrete flared end sections and inlet structures shall be required. Pipe must have smooth interior wall and is not to be used inside the Public Right-of-Way.  
 All concrete pipe or HDPE pipe shall be installed with o-ring rubber type gaskets per M.S.D. Standard Construction Specifications or Manufacturer.
- In typical conditions the minimum trench width is determined by the size of the pipe and the ability to get compaction equipment between the pipe and the trench walls. The minimum trench width should not be less than the outside diameter plus 16 inches or the pipe outside diameter times 1.25 plus 12 inches, whichever is greater. High speed trenchers may make satisfactory installation of pipe in narrower trenches. Poor in situ soil conditions such as peat, muck, running sands, or expansive clays will require substantially wider backfill, as well as deeper foundation and bedding. Trench width and foundation depth should be based on a thorough site investigation.
- Backfill in the area up to the springline should be carefully placed and compacted to achieve a minimum  $\gamma$ -value of 1,000 per sq. ft. as detailed in ASTM D2321. A minimum of 12" of backfill should be placed and compacted above the crown of the pipe. It is typical for trenches to be backfilled entirely with Type I or Type II materials when under pavement.
- Flexible pipe should never be installed in a concrete grade, as done for rigid pipe in a Class A installation. This type of installation could create concentrated forces at the ends of the grade when the pipe has deformed.



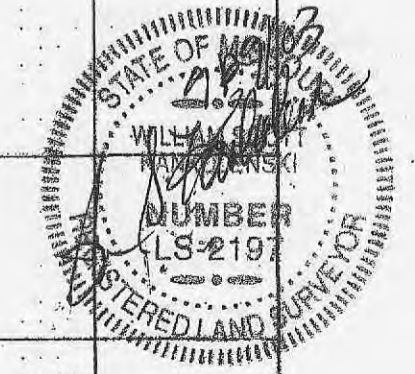
The Overflow Structure is to be a Standard Double Unreinforced Street Inlet Precast Concrete (without top). See M.S.D. Detail 35. The bottom must be constructed to the correct height so that no brick will be used. A rectangular orifice 42" w. x 42" h. with a flowline of 529.50 will be used. (See Detention Calculations.)

Underground utilities have been plotted from available information and, therefore, their locations shall be considered approximate only. The verification of the location of all underground utilities, either shown or not shown, on these plans shall be the responsibility of the Contractor, and shall be located prior to any grading or construction of the improvements.

These engineering plans have been prepared at the request of the developer for construction with some rock data, but not sufficient enough to determine the exact location of all existing rock conditions.

If existing rock conditions are encountered during construction it shall be the responsibility of the developer and/or his contractor to contact Box Engineering Co., Inc. and the soils engineer for the project at the time of encounter to determine the best design to continue construction.

**AS-BUILTS ADDED - AUGUST, 2001**



9/10

