

STORM SEWER HYDROLOGY CALCULATIONS:

Q=CIA
(SEE SHEET C-6.3 FOR DRAINAGE AREA)
AREA 1:
Q(15)=P^{1.48}A^{0.78}
= 3.85*0.91
= 3.5 CFS
AREA 2:
Q(15)=P^{1.48}A^{0.78}
= 3.85*0.04
= 0.15 CFS

CAPACITY OF EXISTING 12" RCP AT 6.00% = 15 YEAR STORM FLOW
Input Data:
Shape Circular
Solving for Depth of Flow
Diameter 1.00 ft
Flowrate 2.20 cfs
Slope 0.06 ft/ft
Manning's n 0.010
Computed Results:
Depth 0.3136 ft
Area 0.78 ft²
Wetted Area 0.21 ft²
Wetted Perimeter 1.18 ft
Perimeter 3.14 ft
Velocity 10.44 fps
Hydraulic Radius 0.17 ft
Percent Full 31.35 %
Full flow Flowrate 10.31 cfs
Full flow velocity 13.13 fps

CAPACITY OF EXISTING 24" RCP AT 7.73% = 15 YEAR STORM FLOW
Input Data:
Shape Circular
Solving for Depth of Flow
Diameter 2.00 ft
Flowrate 5.70 cfs
Slope 0.0773 ft/ft
Manning's n 0.010
Computed Results:
Depth 0.37 ft
Area 3.14 ft²
Wetted Area 0.40 ft²
Wetted Perimeter 1.79 ft
Perimeter 6.28 ft
Velocity 13.99 fps
Hydraulic Radius 0.22 ft
Percent Full 18.73 %
Full flow Flowrate 74.33 cfs
Full flow velocity 23.66 fps

CAPACITY OF 15" PIPE (WEST STORM) AT 4.00% = 15 YEAR STORM FLOW
Input Data:
Shape Circular
Solving for Depth of Flow
Diameter 1.25 ft
Flowrate 3.50 cfs
Slope 0.04 ft/ft
Manning's n 0.011
Computed Results:
Depth 0.40 ft
Area 1.22 ft²
Wetted Area 0.34 ft²
Wetted Perimeter 1.51 ft
Perimeter 3.92 ft
Velocity 10.10 fps
Hydraulic Radius 0.23 ft
Percent Full 32.55 %
Full flow Flowrate 15.26 cfs
Full flow velocity 12.44 fps

CAPACITY OF 15" PIPE (EAST STORM) AT 0.70% = 15 YEAR STORM FLOW
Input Data:
Shape Circular
Solving for Depth of Flow
Diameter 1.25 ft
Flowrate 2.20 cfs
Slope 0.0070 ft/ft
Manning's n 0.011
Computed Results:
Depth 0.50 ft
Area 1.22 ft²
Wetted Area 0.46 ft²
Wetted Perimeter 1.72 ft
Perimeter 3.92 ft
Velocity 4.72 fps
Hydraulic Radius 0.27 ft
Percent Full 40.48 %
Full flow Flowrate 6.38 cfs
Full flow velocity 5.20 fps

SITE BENCHMARK:
X CUT IN CONCRETE APPROX. 37.5' NORTH OF SOUTHWEST CORNER OF PROPERTY.
ELEVATION: 550.17

*NOTE:
ALL STORM WATER DRAINAGE FROM SITE LEAVES SITE THROUGH TWO EXISTING CURB INLETS ON NORTH SIDE OF LOT ONTO MISSOURI RIGHT-OF-WAY.
NO INCREASE IN FLOW ADDED TO OFFSITE DRAINAGE.

*STORM SEWER PIPES HAVE BEEN SIZED TO ADEQUATELY PROVIDE FOR 10 YEAR STORM EVENT.
*MINIMUM 0.20 FEET DROP THROUGH ALL MANHOLES



GRADING NOTES & DETAILS

Items labeled by the following symbols are shown on this sheet:

- XXX GRADING NOTES & DETAILS
- COI MATCH EXISTING PAVING
- SDR1 CURB DRAINAGE CATCH BASIN

GRADING AND DRAINAGE NOTES:

INFORMATION PERTAINING TO UNDERGROUND UTILITIES WAS OBTAINED FROM AVAILABLE RECORDS AND FIELD LOCATIONS WHEN POSSIBLE. BUT THE CONTRACTOR MUST DETERMINE THE EXACT LOCATION AND DEPTH OF ALL UTILITIES PRIOR TO ANY CONSTRUCTION. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE PROTECTION OF ALL UTILITIES. IF ANY UTILITIES ARE FOUND TO BE DEEPER THAN SHOWN ON THE RECORDS, THE CONTRACTOR SHALL STOP WORK IMMEDIATELY AND NOTIFY THE ENGINEER. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE PROTECTION OF ALL UTILITIES. IF ANY UTILITIES ARE FOUND TO BE DEEPER THAN SHOWN ON THE RECORDS, THE CONTRACTOR SHALL STOP WORK IMMEDIATELY AND NOTIFY THE ENGINEER.

ALL DISTURBED AREAS AND SLOPES SHALL BE GRADED SMOOTH AND 4" OF TOP SOIL APPLIED. THE AREA SHALL BE SEEDED AND WATERED UNTIL GRASS GROWTH HAS BEEN ESTABLISHED. (SEE LANDSCAPING GENERAL NOTES FOR SEEDING SPECIFICATIONS)

CONTRACTOR SHALL MAINTAIN ALL EROSION AND SEDIMENTATION CONTROL PRACTICES IN ACCORDANCE WITH THE EROSION CONTROL PLAN AND CONSTRUCTION SCHEDULE. CONTRACTOR SHALL ALSO BE RESPONSIBLE FOR IMPLEMENTING THE BMP'S.

REMOVE GOOD TOPSOIL FROM AREAS TO BE GRADED AND FILLED, AND PRESERVE IT FOR USE IN FINISHING THE GRADE OF ALL DISTURBED AREAS. TO A MINIMUM DEPTH OF 3 INCHES BEFORE PLACING TOPSOIL PER OWNER/DEVELOPER, CITY AND/OR HIGHWAY DEPARTMENT STANDARDS AND SPECIFICATIONS.

CLEAR AND GRUB AREAS TO BE FILLED. REMOVE TREES, VEGETATION, ROOTS, OR OTHER DEBRIS AND OTHER MATERIALS THAT WOULD AFFECT THE STABILITY OF THE FILL.

ENSURE THAT FILL MATERIAL IS FREE OF BRUSH, RUBBISH, ROCKS, LOGS, STUMPS, BUILDING DEBRIS, AND OTHER MATERIALS INAPPROPRIATE FOR FILL.

DO NOT INCORPORATE FROZEN MATERIAL OR SOFT, MUCK, OR HIGHLY COMPRESSIBLE MATERIALS INTO FILL SLOPES.

KEEP DIVERSIONS AND OTHER WATER CONVEYANCE MEASURES FREE OF SEDIMENT DURING ALL PHASES OF DEVELOPMENT.

PERMANENTLY STABILIZE ALL GRADABLE AREAS AFTER FINAL GRADING IS COMPLETED ON EACH AREA OF THE GRADING PLAN. APPLY TEMPORARY STABILIZATION MEASURES ON ALL GRADABLE AREAS WHEN WORK IS TO BE INTERRUPTED OR DELAYED (SEE EROSION CONTROL PLAN).

CONTRACTOR SHALL MATCH TOP OF PROPOSED DRAINAGE STRUCTURES WITH PROPOSED GRADES. IF A DISCREPANCY OCCURS BETWEEN PROPOSED GRADES AND PROPOSED STRUCTURE TOPS, THE GRADING SHALL GOVERN. IF THE DISCREPANCY IS MORE THAN 4 INCHES THE CONTRACTOR SHALL CONTACT THE ENGINEER OF RECORD.

ALL UTILITIES, INCLUDING STORM SEWER, SHOWN WITHIN PUBLIC RIGHT-OF-WAYS SHALL BE CONSTRUCTED TO THE GOVERNING AGENCY'S SPECIFICATIONS. ALL OTHER UTILITIES SHALL BE CONSTRUCTED TO THE CITY OR THE GOVERNING AGENCY'S SPECIFICATIONS, UNLESS OTHERWISE NOTED. IF THERE IS A QUESTION AS TO WHICH SPECIFICATIONS SHOULD APPLY THE CONTRACTOR SHALL CONTACT THE ENGINEER OF RECORD.

ALL EXISTING STRUCTURES, UNLESS OTHERWISE NOTED TO REMAIN, ALL FENCES, TREES, ETC., WITHIN CONSTRUCTION AREA SHALL BE REMOVED & DISPOSED OF OFF SITE. UNLESS OTHERWISE NOTED, ANY BURNING ON SITE SHALL BE SUBJECT TO LOCAL ORDINANCES AND/OR THE OWNER/DEVELOPER'S STANDARDS AND SPECIFICATIONS. (SEE DEMOLITION PLAN)

ALL DRAINAGE STRUCTURES SHALL BE PRE-CAST.

ALL DRAINAGE STRUCTURES AND STORM SEWER PIPES SHALL MEET HEAVY DUTY TRAFFIC (HDT) LOADING AND BE INSTALLED ACCORDINGLY.

CONTRACTOR SHALL NOTIFY ALL UTILITY COMPANIES HAVING UNDERGROUND UTILITIES ON SITE OR IN RIGHT-OF-WAY PRIOR TO EXCAVATION. CONTRACTOR SHALL CONTACT UTILITY LOCATING COMPANY (STATE ONE CALL SYSTEM) AND LOCATE ALL UTILITIES PRIOR TO GRADING START.

SITE GRADING SHALL NOT PROCEED UNTIL EROSION CONTROL MEASURES HAVE BEEN INSTALLED.

AFTER PERMITS HAVE BEEN OBTAINED & EROSION CONTROL MEASURES INSTALLED, THE CONTRACTOR SHALL GRADE BUILDING PAD & AREAS TO 1" TO 2" OF SUBGRADE.

IMMEDIATELY APPLY & CONTRACT STONE BASE FOR BUILDING PAD TO 1/2" PRIOR TO EXCAVATING INTERIOR & PERIMETER FOOTINGS.

GENERAL CONTRACTOR SHALL PROVIDE 2" x 2" x 6" THICK CONCRETE APRON AT ALL CLEANOUTS OUTSIDE OF BUILDING AND IN PAVED AREAS.

CITY NOTES:

CONNECTIONS AT ALL STORM STRUCTURES TO BE MADE WITH A LOCK JOINT OR EQUAL.

HDP PIPE IS TO BE 12" W/RT OR EQUAL AND TO MEET ASTM F417 WATER TIGHT FIELD TEST.

ALL FILL PLACED UNDER PROPOSED STORM AND SANITARY SEWER, PROPOSED ROADS, AND/OR PAVED AREAS SHALL BE COMPACTED TO 95% OF MAXIMUM DENSITY AS DETERMINED BY THE MODIFIED SAND CONE TEST OR 95% OF MAXIMUM DENSITY AS DETERMINED BY THE STANDARD PROCTOR TEST. ALL FILL PLACED IN PROPOSED ROADS SHALL BE COMPACTED FROM THE BOTTOM OF THE FILL UP. ALL TESTS SHALL BE VERIFIED BY A SOIL ENGINEER CONCURRENTLY WITH GRADING AND BACKFILLING OPERATIONS. THE CONTRACTOR SHALL MEET THE ABOVE REQUIREMENTS AS SET FORTH BY THE CITY, OR ASHORE TO THE GEOGRAPHICAL RECOMMENDATIONS, WHICH EVER IS MORE STRINGENT.

CONTRACTOR SHALL PROVIDE 18" DIAMETER TRASH BAR FOR ALL INLETS.

NO SLOPES SHALL BE STEEPER THAN 3 (HORIZONTAL) TO 1 (VERTICAL).

BRICK SHALL NOT BE USED IN THE CONSTRUCTION OF PROPOSED STORM SEWER STRUCTURES. PRECAST CONCRETE STRUCTURES ARE TO BE USED UNLESS OTHERWISE APPROVED BY THE CITY OF FALLON.

DATE	REV	DESCRIPTION
12/15/06	2	REVISIONS TO MCDONALD'S DRIVE
01/16/07	3	CITY COMMENTS 01-16-07
02/13/07	4	REMOVED LEFT TURN LANE ON MCDONALD'S DRIVE
5/30/07	5	REVISED LEFT TURN LANE ON MCDONALD'S DRIVE
5/19/07	6	REVISIONS FOR PLANNING COMMISSION REVIEW
6/15/07	7	REVISIONS FOR PLANNING COMMISSION REVIEW
8/16/07	8	CITY SUBMITTAL
10/1/07	9	CITY COMMENTS 9-18-07
10/9/07	10	MODOT COMMENTS
12/18/07	11	CITY COMMENTS 11-16-07



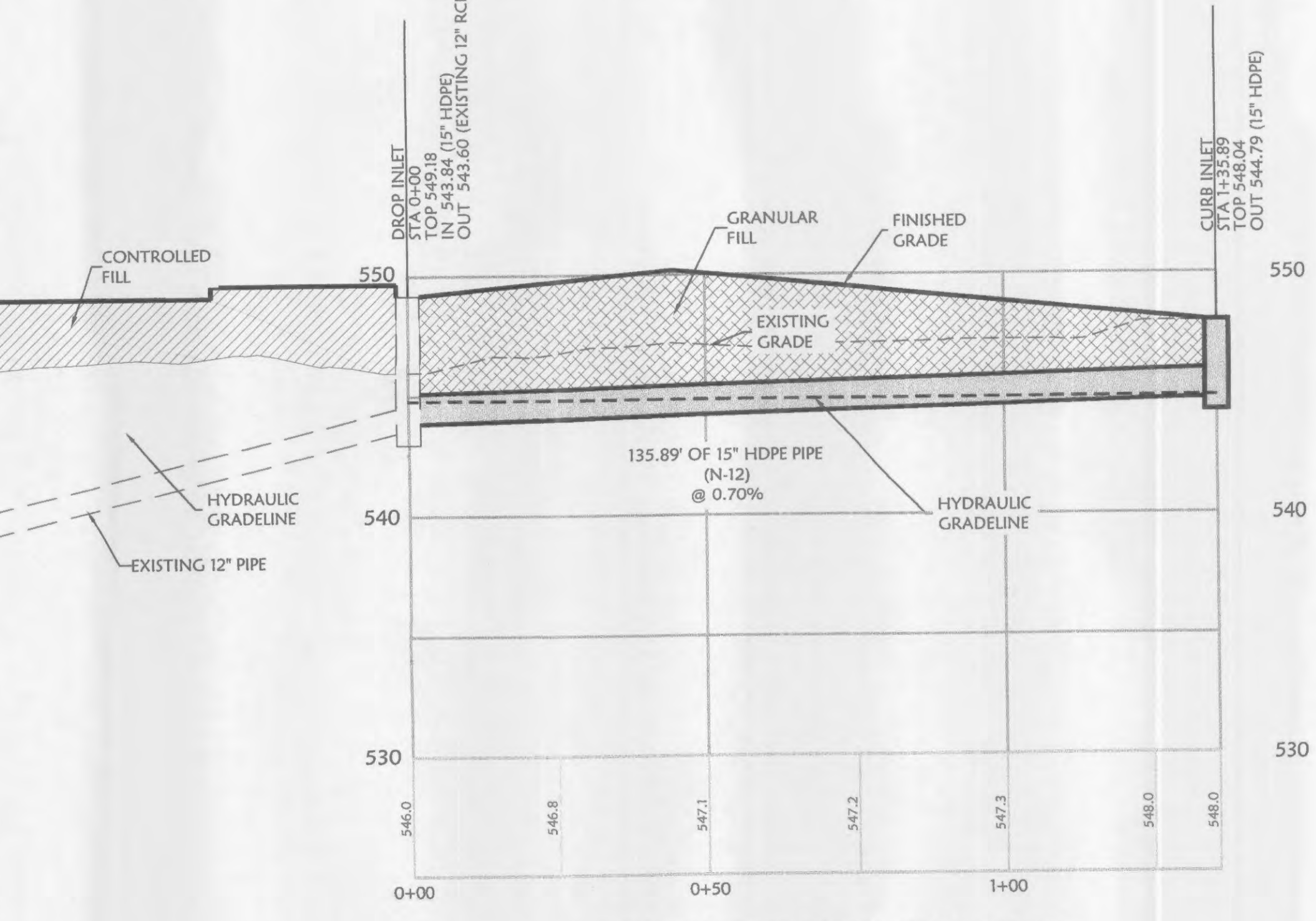
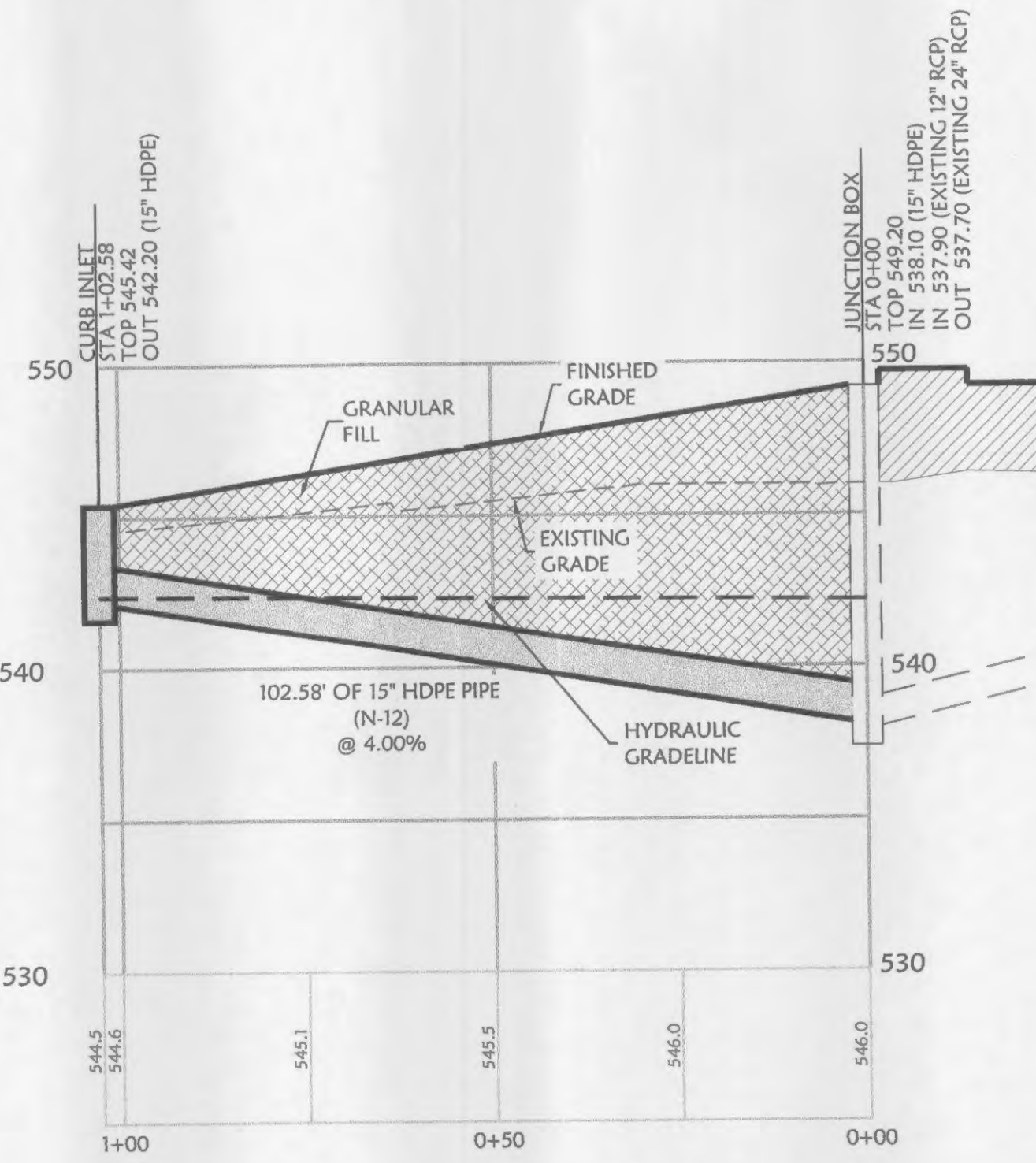
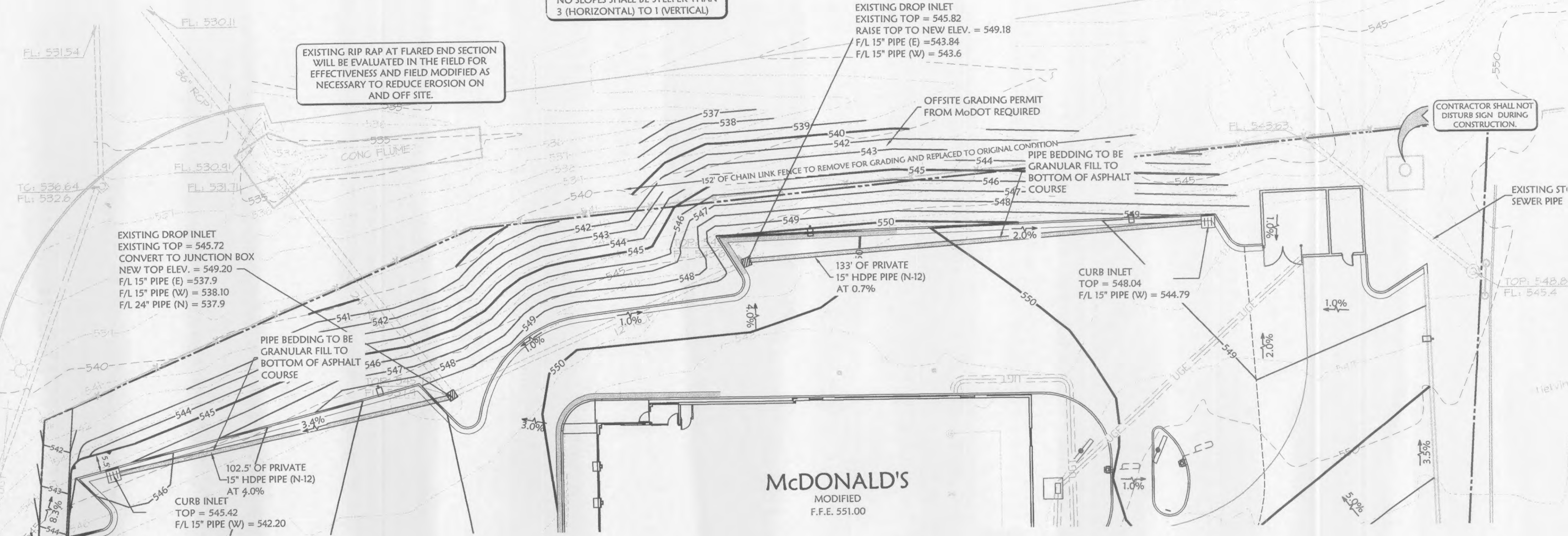
*ASPHALT PAVEMENT SECTION TO BE 3" ASPHALT COURSE COMPACTED TO 95% DENSITY AND 18" COMPACTED STONE BASE COMPACTED TO 98% MODIFIED PROCTOR (PER GEOTECH SPECIFICATIONS).

(REFER TO MCDONALD'S PROJECT MANAGER FOR FURTHER DETAILS)

X Clark
Civil Engineering Inc.
Corp. Office: 1008 N.W. 17th St., Ste. 400, Bonaville, IA 52722
(679) 464-8850 / (679) 464-9940 (F)
Regional Office: 11285 Stone Line, Rd. Linn, IA 52601
(913) 310-0470 / (913) 310-0268 (F)

McDonald's
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KANSAS CITY
10801 MAJSTIN BLVD., STE. 400, OVERLAND PARK, KS 66210



CONTRACTOR TO PROVIDE A MARKING ON ALL STORM SEWER INLETS. THE CITY WILL ALLOW THE FOLLOWING MARKERS AND ADHESIVE PROCEDURES ONLY AS SHOWN IN THE TABLE BELOW OR AN APPROVED EQUAL BY ALMATEK INDUSTRIES. "PEEL AND STICK" PADS WILL NOT BE ALLOWED.

MANUFACTURER	SIZE	ADHESIVE	STYLE	MESSAGE (PART #)	WEBSITE
ACP INTERNATIONAL	3 1/8"	EPOXY	CRYSTAL CAP	NO DUMPING DRAINS TO WATERWAYS (SD-W-CC)	www.acpinternational.com
DAS MANUFACTURING	4"	EPOXY	STANDARD STYLE	NO DUMPING DRAINS TO STREAM (8SDS)	www.dasmanufacturing.com

PLANNING AND DEVELOPMENT FILE #2306
APPROVED AUGUST 2, 2007

GRADING PROPOSED FEATURES

- BOUNDARY LINE
- RIGHT OF WAY LINE
- EASEMENT LINE
- CONCRETE CURB AND CUTTER
- FENCE
- GUARD RAIL
- RETAINING WALL
- SANITARY SEWER SERVICE
- WATER SERVICE
- UNDERGROUND ELECTRIC SERVICE
- UNDERGROUND TELEPHONE SERVICE
- OVERHEAD ELECTRIC SERVICE
- OVERHEAD TELEPHONE SERVICE
- FIBER OPTIC CABLE SERVICE
- GAS SERVICE
- SPOT ELEVATIONS:
- TC=TOP OF CURB
- CC=CUTTER OR CURB
- TG=TOP OF GRADE (BEHIND TOP OF WALL)
- EG=EDGE OF GRADE (AT FRONT OF WALL)
- HP=HIGH POINT
- LP=LOW POINT
- EP=EDGE OF PAVEMENT
- FE=FLARED END SECTION

- RIP-RAP PAD (SEE EROSION PLANS FOR SIZE)
- SANITARY SEWER MANHOLE
- FIRE HYDRANT WITH GUARD POSTS
- UTILITY POLE
- WATER LINE TEE, BEND, VALVE, AND PLUG

STREET ADDRESS
101 MCDONALD'S LANE

CITY: **OFFALON** STATE: **MISSOURI**

COUNTY: **ST. CHARLES**

REGIONAL DWG. NO: **24/0130**

STORM SEWER PLAN AND PROFILES

STATUS: PRELIMINARY DATE: --/--/--
PLAN CHECKED: --/--/--
AS-BUILT: --/--/--
PROJECT NO.: 06-0620

C-6.4