NO ADDITIONAL PAYMENT WILL BE MADE FOR UNDERCUTTING AND REPLACEMENT WITH SUITABLE MATERIAL AS DIRECTED; COMPENSATION SHALL BE CONSIDERED AS INCLUDED IN THE LUMP SUM BASE BID. IN AREAS UNDER THE AS/RS BUILDING THAT ARE CURRENTLY COVERED BY GRASS AND/OR VEGETATION, REMOVE A MINIMUM OF 3 FEET OF SOIL OR, DEEPER IF REQUIRED BY THE AUTHORITY, TO REMOVE ALL TOPSOIL, ROOTS AND ORGANIC MATTER.

#### G. <u>EMBANKMENT</u>

SUITABLE MATERIAL REMOVED FROM THE EXCAVATION, AS DETERMINED BY THE AUTHORITY, SHALL BE USED AS DIRECTED IN THE FORMATION OF FILL SECTIONS, EMBANKMENTS, SUBGRADE, ETC.

BORROW MATERIAL - IF SUFFICIENT SUITABLE MATERIAL IS NOT AVAILABLE FROM SITE EXCAVATION, THE CONTRACTOR SHALL SUPPLY BORROW MATERIAL FROM OFF-SITE SOURCE(S) UNDER THE LUMP SUM BASE BID.

FILL REQUIREMENTS - FILL SUPPLIED BY THE CONTRACTOR FROM AN OFF-SITE SOURCE SHALL BE COMMON FILL, FREE OF ORGANIC OR OTHER DELETERIOUS MATERIAL AND CAPABLE OF SUPPORTING CONSTRUCTION TRAFFIC AND BEING COMPACTED TO THE DENSITIES HEREINAFTER SPECIFIED. NEW FILL MATERIAL SHALL BE A CLEAN, FREE DRAINING, GRANULAR SOIL CONTAINING LESS THAN 15% SILT AND SHALL MEET WITH THE APPROVAL OF THE AUTHORITY. FINAL ACCEPTANCE OF FILL MATERIAL SHALL REST WITH THE AUTHORITY. WHOSE DECISION SHALL BE FINAL AND BINDING UPON THE CONTRACTOR. THE ACCEPTANCE OF ANY SAMPLE MATERIAL SHALL NOT RELIEVE THE CONTRACTOR OF THE RESPONSIBILITY TO HAVE ALL FILL MATERIAL USED CONFORM TO THE APPROVED SAMPLES.

COMPACTION OF EMBANKMENT FOUNDATION - PRIOR TO PLACING FILLS, THE CONTRACTOR SHALL COMPACT TO A DEPTH OF ONE (1) FOOT, THE EXPOSED THE AREAS TO RECEIVE FILL OR THE EMBANKMENT FOUNDATION TO THE DENSITIES HEREINAFTER SPECIFIED, BY PROOF-ROLLING WITH A LARGE SELF-PROPELLED ROLLER SATISFACTORY TO THE AUTHORITY.

PLACING OF FILL - FILL SECTIONS AND EMBANKMENTS SHALL BE CONSTRUCTED OF EARTH OR A MIXTURE OF EARTH AND ROCK, DEPOSITED IN SUCCESSIVE LIFTS, EXCEPT THAT, IN THE BUILDING AREA AND TO POINTS TEN (10) FEET OUTSIDE OF THE PROPOSED BUILDING LINES, ALL FILL REQUIRED TO ACHIEVE THE PLANNED FINISHED FLOOR ELEVATIONS SHALL BE CLEAN, STRUCTURAL FILL AS APPROVED BY THE AUTHORITY. STRUCTURAL FILL MUST CONSIST OF HARD, DURABLE SAND, AND GRAVEL, FREE OF CLAY, ORGANIC MATTER, SURFACE COATINGS, AND OTHER DELETERIOUS MATERIALS. SOIL FINER THAN THE NO. 200 SIEVE(THE "FINES") SHOULD BE NONPLASTIC. STRUCTURAL FILL SHALL MEET THE FOLLOWING GRADATION REQUIREMENTS:

SIEVE SIZE PERCENT PASSING BY WEIGHT 3 INCHES 100 1-1/2 INCH 55-100 NO.4 35–85 NO.16 20-65 NO.50 5-40

NO.200 (FINES)

NO.200 (FINES)

ORDINARY FILL MUST CONSIST OF HARD, DURABLE SAND AND GRAVEL OR CRUSHED CONCRETE, FREE OF CLAY, ORGANIC MATTER, SURFACE COATINGS, AND OTHER DELETERIOUS MATERIALS. SOIL FINER THAN THE NO.200 SIEVE (THE "FINES") SHOULD BE NONPLASTIC. ORDINARY FILL SHALL MEET THE FOLLOWING GRADATION REQUIREMENTS:

0-10

0-20

SIEVE SIZE PERCENT PASSING BY WEIGHT 6 INCHES 3 INCHES 80-100 NO.4 20-100

GRADATION CURVES FOR ALL PROPOSED BACKFILL AND STRUCTURAL BACKFILL MATERIAL SHALL BE SUBMITTED TO THE ENGINEER FOR REVIEW. NO MATERIAL SHALL PLACED ON-SITE WITHOUT APPROVAL OF THE GRADATION CURVES. THE LOOSE THICKNESS OF EACH LIFT SHALL NOT BE MORE THAN NINE (9) INCHES BEFORE COMPACTION. EACH LIFT MATERIAL PLACED SHALL BE TESTED FOR PROPER COMPACTION AND APPROVED BY THE AUTHORITY PRIOR TO PLACEMENT OF THE NEXT LIFT. FILL SHALL BE PLACED AND COMPACTED TO THE REQUIRED ELEVATIONS (ADJUSTED TO SUBGRADE) INDICATED ON THE DRAWINGS. FILL SHALL BE COMPACTED WITH A LARGE SELF-PROPELLED ROLLER. SATISFACTORY TO THE AUTHORITY. WHEN FILL IS TO BE PLACED IN EXISTING PAVED AREAS, THE CONTRACTOR SHALL SCARIFY. BREAK AND REMOVE THE PAVEMENT PRIOR TO PLACING THE FILL. WHEN FILL IS TO BE PLACED ON EXISTING SLOPES STEEPER THAN 4 HORIZONTAL TO 1 VERTICAL THE EXISTING SLOPE SHALL BE BENCHED IN ACCORDANCE WITH THE AUTHORITY. IN ALL SLOPE AREAS FILL MATERIAL SHALL BE BLADED INTO THE ADJACENT EXISTING MATERIAL FOR A HORIZONTAL DISTANCE OF AT LEAST FIVE (5) FEET. ALL METHODS EMPLOYED IN THE PLACING OF FILL ON EXISTING SLOPES SHALL BE SUBJECT TO THE APPROVAL OF THE AUTHORITY. EMBANKMENTS SHALL BE PITCHED TO PROVIDE DRAINAGE AT THE CLOSE OF EACH DAY'S OPERATIONS. UNLESS DIRECTED OTHERWISE, IN NO CASE SHALL THE SLOPE OF FILL CONSTRUCTION EXCEED A RATIO OF 3 HORIZONTAL TO 1 VERTICAL.

COMPACTION OF FILL - PRIOR TO COMPACTION, EACH LAYER SHALL BE LEVELED OFF BY USE OF GRADERS OR BULLDOZERS WITH ADEQUATE POWER FOR THE WORK INVOLVED. THE ENTIRE AREA OF EACH LAYER SHALL BE COMPACTED BY MAKING NO LESS THAN FOUR (4) PASSES OVER THE AREA WITH A LARGE SELF-PROPELLED ROLLER OR OTHER MECHANICAL MEANS SATISFACTORY TO THE AUTHORITY. COMPACTION SHALL BE CONTINUED UNTIL EACH LAYER IS THOROUGHLY CONSOLIDATED TO THE REQUIRED DEGREE OF COMPACTION FOR ITS FULL WIDTH. THE USE OF HAULING EQUIPMENT TO OBTAIN PARTIAL COMPACTION IS ACCEPTABLE, BUT COMPACTION MEETING THE SATISFACTION OF THE AUTHORITY FOR EACH LIFT WILL BE REQUIRED. CONSTRUCTION AND HAULING EQUIPMENT SHALL BE ROUTED EVENLY OVER THE AREA IN ORDER TO AVOID THE CREATION OF RIDGES, HOLLOWS AND ZONES OF NON-UNIFORM DENSITY. IN AREAS WITHIN PROPOSED BUILDINGS AND TO POINTS TEN (10) FEET OUTSIDE THE BUILDING LINES, AND IN PAVEMENT AREAS, THE SOIL SHALL BE COMPACTED TO NOT LESS THAN 95% OF ITS MAXIMUM MODIFIED DENSITY AS DEFINED BY ASTM D-1557. IN ALL OTHER AREAS, UNLESS OTHERWISE NOTED, THE SOIL SHALL BE COMPACTED TO NOT LESS THAN 92% OF ITS MAXIMUM MODIFIED DENSITY AS DEFINED BY ASTM D-1557.

FROST - NO FILL SHALL BE PLACED WHEN THE FILL MATERIAL, THE EMBANKMENT FOUNDATION OR THE PREVIOUS LIFT ON WHICH FILL IS TO BE PLACED IS FROZEN. IN THE EVENT THAT ANY FILL WHICH HAS ALREADY BEEN PLACED OR THE EMBANKMENT FOUNDATION SHALL BECOME FROZEN BEFORE THE NEXT LIFT IS PLACED, IT SHALL BE SCARIFIED AND RECOMPACTED OR REMOVED TO THE APPROVAL OF THE AUTHORITY.

MOISTURE - IF, IN THE OPINION OF THE AUTHORITY, FILL MATERIAL BECOMES TOO WET FOR THE REQUIRED COMPACTION, PRIOR TO COMMENCING OR CONTINUING COMPACTION OPERATIONS, THE FILL SHALL BE DRIED BY A METHOD APPROVED BY THE AUTHORITY. IF THE FILL MATERIAL BECOMES TOO DRY FOR THE REQUIRED. COMPACTION, THE FILL SHALL BE MOISTENED PRIOR TO COMMENCING OR CONTINUING COMPACTION OPERATIONS, BY A METHOD APPROVED BY THE AUTHORITY.

PROTECTION OF FILL - PROTECTION OF ALL COMPACTED LIFTS SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR. DAMAGE TO ANY COMPACTED LIFT, INCLUDING THOSE LIFTS PREVIOUSLY TESTED AND APPROVED BY THE AUTHORITY, OCCURRING AT ANY TIME DURING THE COURSE OF CONSTRUCTION, CAUSED BY EQUIPMENT, FROM MOISTURE ENTERING THE EMBANKMENT, OR FROM ANY OTHER CAUSE WHATSOEVER, SHALL BE FULLY REPAIRED BY THE CONTRACTOR PRIOR TO PLACEMENT OF OVERLAYING MATERIALS, AT HIS OWN EXPENSE AND TO THE COMPLETE SATISFACTION OF THE AUTHORITY. IN THE EVENT OF HEAVY RAINS, THE CONTRACTOR SHALL

SUSPEND FILL OPERATIONS IMMEDIATELY AND SHALL TAKE ALL NECESSARY STEPS TO KEEP THE SITE AS WELL DRAINED AS POSSIBLE. FILL OPERATIONS SHALL NOT BE RESUMED UNTIL THE MOISTURE CONTENT OF THE FILL IS SUCH AS TO PERMIT COMPLIANCE WITH THESE SPECIFICATIONS. ALL CORRECTIVE WORK OR OPERATIONS NECESSARY TO MAINTAIN PROPER MOISTURE CONTROL OF THE FILL MATERIAL SHALL BE AT THE EXPENSE OF THE CONTRACTOR.

### H. PROOF-ROLLING OF SUBGRADE SURFACES

ALL SUBGRADE SURFACES SHALL BE PROOF-ROLLED BY MEANS OF A LARGE SELF-PROPELLED ROLLER SATISFACTORY TO THE AUTHORITY MAKING AT LEAST FOUR (4) PASSES COVERING THE ENTIRE GRADED AREA TO LOCATE AND PERMIT TIMELY CORRECTION OF SUBGRADE DEFICIENCIES WHICH COULD ADVERSELY AFFECT THE PERFORMANCE OF THE PAVEMENT OR STRUCTURE. ANY DEFICIENCIES DISCOVERED DURING PROOF-ROLLING OPERATIONS SHALL BE CORRECTED IN A MANNER SATISFACTORY TO THE AUTHORITY. CORRECTIVE WORK SHALL NOT BE CONSIDERED COMPLETE AND ACCEPTABLE UNTIL THE SUBGRADE SHOWS SATISFACTORY AND UNIFORM RESPONSE TO THE PROOF-ROLLING OPERATIONS. ALL WORK OF PROOF-ROLLING AND CORRECTION OF SUBGRADE DEFICIENCIES SHALL BE CONSIDERED AS INCLUDED IN THE LUMP SUM BASE BID.

## I. SHEETING, SHORING AND BRACING

AT HIS OWN EXPENSE, THE CONTRACTOR SHALL FURNISH, INSTALL, AND MAINTAIN SUCH SHEETING, SHORING, BRACING AND COFFERDAMMING, ETC., AS MAY BE NEEDED TO SUPPORT THE SIDES AND ROOFS OF EXCAVATIONS AND TO PREVENT ANY EARTH OR ROCK MOVEMENTS WHICH MIGHT IN ANY WAY DIMINISH OR AFFECT THE NECESSARY WIDTH OF THE EXCAVATION, ENDANGER THE SAFETY OF PERSONS INJURE OR DELAY THE WORK, OR JEOPARDIZE THE SAFETY OF ADJACENT PAVEMENTS, PROPERTY, BUILDINGS OR OTHER STRUCTURES. THE WORK OF SHEETING, SHORING AND BRACING SHALL, AT ALL TIMES, BE IN ACCORDANCE WITH THE REQUIREMENTS OF ALL AUTHORITIES HAVING JURISDICTION, INCLUDING OSHA AND SUBMITTED TO THE ENGINEER FOR REVIEW. THE DESIGN SHALL BE SIGNED AND SEALED BY A LICENSED NYS PROFESSIONAL ENGINEER.

THE CONTRACTOR SHALL BE ENTIRELY AND SOLELY RESPONSIBLE FOR THE ADEQUACY AND SUFFICIENCY OF ALL SUPPORTS AND OF ALL SHEETING. BRACING. SHORING, COFFERDAMMING, ETC. THE CONTRACTOR SHALL ASSUME ENTIRE AND SOLE LIABILITY FOR DAMAGES ON ACCOUNT OF INJURY TO PERSONS, ADJACENT PAVEMENTS, AND PUBLIC AND PRIVATE PROPERTY INCLUDING, BUT NOT LIMITED TO, THE WORK UNDER CONSTRUCTION, BUILDINGS, AND OTHER STRUCTURES, WHICH INJURY SHALL RESULT DIRECTLY OR INDIRECTLY FROM THE CONTRACTOR'S FAILURE TO INSTALL OR TO LEAVE IN PLACE ADEQUATE AND SUFFICIENT SUPPORTS. SHEETING, BRACING, SHORING, COFFERDAMMING, ETC.

#### J. <u>DEWATERING OF EXCAVATIONS</u>

DEWATERING OF EXCAVATIONS MAY BE REQUIRED TO PREVENT DISTURBANCE TO THE FOOTING AND SUBGRADES. IF WATER IS ENCOUNTERED, THE CONTRACTOR MAY ATTEMPT TO CONTROL GROUNDWATER LEVELS WITH OPEN PUMPING USING A SYSTEM OF DITCHES AND SUMPS. HOWEVER, OPEN PUMPING WITH DITCHES AND SUMPS, IF IT RESULTS BOILS, LOSS OF FINES, SOFTENING OF THE GROUND, OR INSTABILITY OF SLOPES WILL NOT BE PERMITTED. CONTROL OF GROUNDWATER SHALL BE ACCOMPLISHED IN A MANNER THAT WILL PRESERVE THE STRENGTH OF THE FOUNDATION SOILS, WILL NOT CAUSE INSTABILITY OF THE EXCAVATION OR SLOPES, WILL NOT CAUSE EROSION PROBLEMS, AND WILL NOT RESULT IN DAMAGE TO EXISTING STRUCTURES. WHERE NECESSARY TO ACCOMPLISH THESE PURPOSES, THE WATER LEVEL SHALL BE LOWERED IN ADVANCE OF EXCAVATION BY A DEWATERING SYSTEM. WHATEVER METHOD OF GROUNDWATER CONTROL IS USED (E.G., DITCHES, SUMPS, ETC.), THE GROUNDWATER LEVEL SHALL BE MAINTAINED AT LEAST TWO (2) FEET BELOW THE BOTTOM OF THE EXCAVATION.

METHOD OF DISPOSAL - THE WATER FROM THE EXCAVATIONS SHALL BE DISPOSED OF IN SUCH A MANNER AS WILL NOT CAUSE INJURY OR DAMAGE TO THE PUBLIC HEALTH, PUBLIC OR PRIVATE PROPERTY, NEARBY WATERCOURSES, DRAINAGEWAYS, WATER IMPOUNDMENT AREAS, THE WORK CONTEMPLATED OR IN PROGRESS, SURFACES OF THE STREETS, NOR CAUSE ANY INTERFERENCE WITH THE USE OF THE SAME. THE WATER SHALL BE FILTERED, AND THE DISPOSAL OF THIS WATER SHALL BE DONE IN A MANNER SATISFACTORY TO ALL AUTHORITIES HAVING JURISDICTION, COMPLYING WITH LOCAL, STATE AND FEDERAL REGULATIONS.

## IV.TRENCH EXCAVATION AND BACKFILL

THE CONTRACTOR SHALL PROVIDE ALL LABOR, PLANT, MATERIAL, AND EQUIPMENT NECESSARY AND REQUIRED TO EXCAVATE AND BACKFILL ALL UTILITY SYSTEMS AND SUBSURFACE STRUCTURES TO BE INSTALLED UNDER THIS CONTRACT. WORK SHALL INCLUDE, BUT NOT BE LIMITED TO, ALL NECESSARY EXCAVATION, INCLUDING DISPOSAL OF UNSUITABLE AND/OR SURPLUS EXCAVATED MATERIAL; ALL BEDDING, BACKFILL AND COMPACTION, INCLUDING FURNISHING APPROVED BEDDING MATERIAL AND ADDITIONAL SUITABLE BACKFILL MATERIAL AS REQUIRED; SHEETING, SHORING AND BRACING; AND DEWATERING OF TRENCHES AS NECESSARY.

ALL SECTIONS OF THIS SPECIFICATION BELOW, SHALL HAVE METHODS AND MATERIALS APPROVED BY THE OWNER'S FIELD REPRESENTATIVE OR GEOTECHNICAL ENGINEER. HEREIN REFERRED TO AS THE 'AUTHORITY'.

ALL WORK SHALL BE AS APPROVED, AND PERFORMED TO THE SATISFACTION OF THE OWNER, OWNER'S FIELD REPRESENTATIVE, GEOTECHNICAL ENGINEER, OR THE AUTHORITY HAVING JURISDICTION.

## <u>GENERAL</u>

TRENCH EXCAVATION SHALL BE CARRIED OUT BY THE CONTRACTOR TO CONFORM WITH THE LINE AND GRADE OF THE VARIOUS UTILITIES AND THE BOTTOM OF THE FOUNDATIONS AND/OR FOOTINGS FOR SUBSURFACE STRUCTURES. ALL EXCAVATIONS SHALL BE KEPT FREE FROM WATER, SNOW, AND ICE DURING CONSTRUCTION.

THE CONTRACTOR SHALL BE RESPONSIBLE FOR CONDUCTING ALL OPERATIONS IN A SAFE AND PRUDENT MANNER SO THAT ALL WORKMEN AND THE PUBLIC WILL BE PROTECTED FROM HAZARD. THE CONTRACTOR SHALL OBSERVE ALL APPLICABLE LOCAL, COUNTY, STATE AND FEDERAL REQUIREMENTS, AND HE SHALL OBTAIN ALL NECESSARY PERMITS AND PAY ALL FEES, DEPOSITS AND CHARGES REQUIRED FOR ACQUIRING SAID PERMITS.

## C. TRENCH EXCAVATION

GENERAL REQUIREMENTS - THE CONTRACTOR SHALL EXCAVATE ALL MATERIALS ENCOUNTERED, AND THERE WILL BE NO EXTRA COMPENSATION FOR ANY EXCAVATION, REGARDLESS OF THE CHARACTER OR TYPE OF SOILS OR MATERIALS ENCOUNTERED.

METHOD OF TRENCHING - TRENCH EXCAVATION SHALL BE DONE WITH EXCAVATING MACHINERY, EXCEPT IN SUCH PLACES WHERE WORK PERFORMED IN THIS MANNER WILL INJURE TREES, BUILDINGS OR EXISTING UTILITIES OR STRUCTURES, OR WHERE THE USE OF MACHINERY IS SPECIFICALLY FORBIDDEN, IN WHICH CASE HAND METHODS SHALL BE EMPLOYED.

PREPARATION OF BOTTOM OF TRENCH - THE TRENCH BOTTOMS SHALL BE PREPARED TO CONFORM TO THE DETAILS ON THE DRAWINGS AND AS SPECIFIED HEREIN. SPECIAL PRECAUTIONS SHALL BE EXERCISED TO INSURE THAT PIPE AND CONDUIT WILL NOT REST ON ROCK. MASONRY OR ANY OTHER MATERIALS WHICH WOULD PRESENT A NON-UNIFORM FOUNDATION. FOR BELL AND SPIGOT PIPE, BELL HOLES SHALL BE PROVIDED AT EACH PIPE JOINT TO PREVENT BEARING ON THE BELL OF THE PIPE. WHERE TWO OR MORE PIPES OR CONDUITS ARE TO BE LAID IN THE SAME TRENCH, THE CONTRACTOR SHALL EXCAVATE THE TRENCH SO THAT ALL PIPE AND CONDUIT ARE LAID ON UNDISTURBED OR APPROVED PROPERLY COMPACTED MATERIAL.

UNSUITABLE MATERIAL AT BOTTOM OF TRENCH — WHEN THE MATERIAL AT THE BOTTOM OF A TRENCH IS UNSUITABLE, IT SHALL BE REMOVED TO SUCH DEPTH AS THE AUTHORITY MAY DIRECT, DISPOSED OF OFF-SITE, AND BACKFILLED WITH SUITABLE AND PROPERLY COMPACTED GRANULAR MATERIAL OBTAINED FROM THE

PROJECT EXCAVATION, OR FROM BORROW EXCAVATION IF IT IS NOT AVAILABLE WITHIN THE PROJECT. COMPACTION OF THIS REPLACEMENT MATERIAL SHALL BE NOT LESS THAN 95% MAXIMUM MODIFIED DENSITY (ASTM D-1557). PAYMENT FOR REMOVAL OF UNSUITABLE MATERIAL AND REPLACEMENT WITH SUITABLE COMPACTED GRANULAR MATERIAL, AS DIRECTED, SHALL BE CONSIDERED AS INCLUDED UNDER THE LUMP SUM

EXCAVATION IN PAVED AREAS — WHEN EXCAVATIONS ARE TO BE MADE IN PAVED SURFACES, THE PAVED SURFACES SHALL BE LINE CUT ON EACH SIDE OF THE TRENCH AND AHEAD OF THE EXCAVATION BY MEANS OF SAW CUTTING OR OTHER APPROVED TOOLS TO PROVIDE A CLEAN, UNIFORM EDGE, WITH MINIMUM DISTURBANCE OF THE REMAINING PAVEMENT. THE PAVEMENT REMOVED SHALL NOT BE USED FOR TRENCH BACKFILL, BUT SHALL BE DISPOSED OF OFF-SITE.

UNSUITABLE EXCAVATED MATERIAL — UNSUITABLE EXCAVATED MATERIAL SHALL BE DISPOSED OF OFF-SITE BY THE CONTRACTOR.

SURPLUS EXCAVATED MATERIAL — EXCAVATED MATERIAL WHICH IS NOT REQUIRED FOR TRENCH BACKFILL SHALL BE DISPOSED OF OFF-SITE BY THE CONTRACTOR. IN GENERAL, SUITABLE SURPLUS EXCAVATED MATERIAL MAY BE USED AS FILL MATERIAL. ROCK EXCAVATION IN TRENCH

IF ROCK IS ENCOUNTERED IN TRENCH, THE CONTRACTOR SHALL EXCAVATE, REMOVE AND DISPOSE OF ROCK WITHIN THE LIMITS SPECIFIED AND IN ACCORDANCE WITH THE DRAWINGS AND SPECIFICATIONS AND/OR AS APPROVED BY THE AUTHORITY. ROCK EXCAVATION IN TRENCH SHALL BE DEFINED AS REMOVAL OF BOULDERS LARGER THAN ONE (1) CUBIC YARD IN VOLUME AND REMOVAL OF LEDGE ROCK, CONCRETE OR MASONRY STRUCTURES WHICH CANNOT BE RIPPED WITH A ONE AND ONE-HALF (1-1/2) CUBIC YARD BACKHOE OR EQUIVALENT AND REQUIRES DRILLING, BLASTING, OR OTHER SPECIAL METHODS FOR REMOVAL. REMOVAL OF CONCRETE PAVEMENT OVER TRENCH IS NOT CONSIDERED ROCK EXCAVATION IN TRENCH. FOR PIPE AND CONDUIT INSTALLATION, ROCK EXCAVATION SHALL BE CARRIED TO A LEVEL AT LEAST SIX (6) INCHES BELOW THE BOTTOM OF THE PIPE OR CONDUIT. THE TRENCH SHALL THEN BE BROUGHT TO PROPER GRADE FOR LAYING OF THE PIPE OR CONDUIT BY THE PLACING OF SELECT BEDDING AS DIRECTED BY THE AUTHORITY.

SHATTERED ROCK - IF, IN THE COURSE OF ROCK EXCAVATION, THE ROCK BELOW GRADE IS SHATTERED DUE TO OVER-DRILLING OR OVER-BLASTING, AND THE AUTHORITY CONSIDERS SUCH SHATTERED ROCK TO BE UNFIT FOR SUPPORT OF PIPE, CONDUIT OR STRUCTURES, THE SHATTERED ROCK SHALL BE REMOVED AND THE EXCAVATION BACKFILLED WITH CONCRETE, GRAVEL OR CRUSHED STONE, AS THE AUTHORITY REQUIRES. ALL SUCH REMOVAL, BACKFILLING AND CORRECTIVE WORK SHALL BE DONE BY AND AT THE EXPENSE OF THE CONTRACTOR.

BLASTING - WHEN DRILLING AND BLASTING ARE PERMITTED, THE CONTRACTOR MUST EMPLOY LICENSED PERSONNEL, AND ADHERE TO ALL LOCAL, COUNTY, STATE AND OSHA REGULATIONS REGARDING THE USE AND STORAGE OF EXPLOSIVES, AND HE SHALL ACQUIRE ALL NECESSARY INSURANCE, PERMITS AND LICENSES. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL DAMAGES DUE EITHER DIRECTLY OR INDIRECTLY TO SUCH OPERATIONS. BLASTING, WHEN PERMITTED, SHALL BE DONE ONLY AT SUCH TIMES AS THE OWNER AND THOSE AUTHORITIES HAVING JURISDICTION SHALL APPROVE AND UNDER SUCH CONDITIONS AND RESTRICTIONS AS THEY MAY IMPOSE.

NO ADDITIONAL PAYMENT WILL BE MADE FOR ROCK EXCAVATION IN TRENCH; COMPENSATION SHALL BE CONSIDERED AS INCLUDED IN THE LUMP SUM BASE BID.

### D. <u>BEDDING</u>

BEDDING IN TRENCH FOR PIPE AND CONDUIT SHALL BE AS SHOWN IN DETAIL ON THE DRAWINGS AND AS SPECIFIED HEREIN. REQUIREMENTS FOR BEDDING SHALL BE AS FOLLOWS:

- (a) STANDARD BEDDING SHALL CONSIST OF BEDDING THE PIPE OR CONDUIT ON A PROPERLY PREPARED FOUNDATION OF NATURAL UNDISTURBED EARTH FOR TRENCH EXCAVATION IN CUT AREAS AND PROPERLY COMPACTED EARTH FOR TRENCH EXCAVATION IN FILL AREAS. THE BED SHALL HAVE RECESSES TO RECEIVE THE BELL OF BELL AND SPIGOT PIPE.
- (b) SELECT BEDDING SHALL CONSIST OF A BED OF PROPERLY COMPACTED GRANULAR BEDDING MATERIAL (SAND OR CRUSHED STONE AS SPECIFIED) HAVING A COMPACTED THICKNESS OF AT LEAST SIX (6) INCHES BELOW THE BOTTOM OF THE PIPE OR CONDUIT AND EXTENDING AROUND THE PIPE OR CONDUIT FOR AT LEAST 30% OF ITS DIAMETER OR RISE. SAND SHALL CONSIST OF CLEAN, WELL GRADED, HARD, DURABLE PARTICLES, FREE OF LUMPS OF CLAY, LOAM, AND ALL OTHER DELETERIOUS SUBSTANCES CRUSHED STONE SHALL CONSIST OF WELL GRADED CRUSHED STONE CONFORMING TO ASTM DESIGNATION C-33, SIZE NO. 67. WHEN SELECT BEDDING IS SPECIFIED. THE CONTRACTOR SHALL FURNISH. PLACE AND COMPACT ALL NECESSARY AND REQUIRED SELECT BEDDING MATERIAL AT NO ADDITIONAL COST TO THE OWNER.

SELECT BEDDING SHALL BE USED FOR ALL POLYETHYLENE (HDPE) AND POLYVINYL CHLORIDE (PVC) PIPE AND CONDUIT INSTALLATION. EXCEPT FOR HDPE AND PVC PIPE AND CONDUIT INSTALLATION, AND UNLESS OTHERWISE SHOWN ON THE DETAILS OF THE DRAWINGS. SPECIFIED, OR DIRECTED BY THE AUTHORITY. STANDARD BEDDING MAY BE USED.

UPON APPROVAL BY THE AUTHORITY OF BEDDING AND PIPE INSTALLATION, AND AFTER PROPER INSPECTION AND ANY REQUIRED TESTS HAVE BEEN MADE, EXCAVATIONS SHALL BE BACKFILLED BY THE CONTRACTOR WITH THE TYPE OF BACKFILL MATERIAL SPECIFIED. EXCAVATIONS SHALL BE BACKFILLED AND COMPACTED AS FOLLOWS:

- (a) STANDARD BACKFILL SHALL CONSIST OF ON-SITE MATERIAL (EARTH) APPROVED BY THE AUTHORITY. SHOULD THERE BE A DEFICIENCY OF PROPER ON-SITE MATERIAL FOR BACKFILLING, THE CONTRACTOR SHALL FURNISH, PLACE AND COMPACT ADDITIONAL PROPER BACKFILL MATERIAL, AT NO ADDITIONAL COST TO THE OWNER.
- (b) SELECT BACKFILL SHALL CONSIST OF GRANULAR MATERIAL (SAND OR CRUSHED STONE AS SPECIFIED) AS APPROVED BY THE AUTHORITY. SAND SHALL CONSIST OF CLEAN, WELL GRADED, HARD, DURABLE PARTICLES, FREE OF LUMPS OF CLAY, LOAM, AND ALL OTHER DELETERIOUS SUBSTANCES. CRUSHED STONE SHALL CONSIST OF WELL GRADED CRUSHED STONE CONFORMING TO ASTM DESIGNATION C-33, SIZE NO. 67.

ALL BACKFILL MATERIAL SHALL BE FREE FROM LARGE STONES, CLODS, TOPSOIL, SOD, FROZEN EARTH, WOOD, OR ANY OTHER OBJECTIONABLE MATERIAL AS DETERMINED BY THE AUTHORITY.

FOR ALL HDPE AND PVC PIPE AND CONDUIT INSTALLATION, SELECT BACKFILL SHALL BE USED TO BACKFILL THE TRENCH UNTIL THERE IS A MINIMUM OF SIX (6) INCHES OF COVER OVER THE PIPE OR CONDUIT. ABOVE THIS LEVEL, AND UNLESS SPECIFIED OTHERWISE OR DIRECTED BY THE AUTHORITY, STANDARD BACKFILL MAY BE USED. EXCEPT FOR HDPE AND PVC PIPE AND CONDUIT INSTALLATION AND UNLESS OTHERWISE SHOWN ON THE DETAILS OF THE DRAWINGS, SPECIFIED, OR DIRECTED BY THE AUTHORITY, STANDARD BACKFILL MAY BE USED.

WHERE USE OF STANDARD BACKFILL IS PERMITTED. THE MATERIAL USED TO BACKFILL THE TRENCH UP TO A LEVEL TWO (2) FEET ABOVE THE TOP OF THE PIPE SHALL BE APPROVED CLEAN EARTH AND SHALL CONTAIN NO STONE OR BROKEN ROCK GREATER THAN ONE (1) INCH IN SIZE. ABOVE A LEVEL TWO (2) FEET HIGHER THAN THE TOP OF PIPE, THE MATERIAL USED FOR BACKFILL SHALL BE APPROVED MATERIAL, WHICH MAY CONTAIN NOT MORE THAN FIFTEEN (15) PERCENT STONE OR BROKEN ROCK WITH NO STONE OR PIECE THEREOF EXCEEDING FOUR (4) INCHES IN SIZE. SUCH STONE OR BROKEN ROCK SHALL BE THOROUGHLY MIXED WITH THE EARTH SO THAT THERE WILL BE NO VOIDS IN THE BACKFILL.

PLACEMENT AND COMPACTION - BACKFILL FOR PIPE AND CONDUIT SHALL BE

PLACED EVENLY AND CAREFULLY AROUND AND OVER THE PIPE OR CONDUIT IN SIX (6) INCH MAXIMUM LAYERS. EACH LAYER SHALL BE THOROUGHLY AND CAREFULLY COMPACTED UNTIL TWELVE (12) INCHES OF COVER EXISTS OVER THE PIPE OR CONDUIT. THE REMAINDER OF THE BACKFILL MAY THEN BE PLACED AND COMPACTED IN MAXIMUM TWELVE (12) INCH LAYERS. EACH LAYER SHALL BE COMPACTED BY APPROVED MECHANICAL TAMPING MACHINES. BACKFILL IN PAVED AREAS SHALL BE COMPACTED TO NOT LESS THAN 95% MAXIMUM MODIFIED DENSITY IN ACCORDANCE WITH ASTM D-1557; BACKFILL IN NON-PAVED AREAS SHALL BE COMPACTED TO NOT LESS THAN 92% MAXIMUM MODIFIED DENSITY IN ACCORDANCE WITH ASTM D-1557. BACKFILL SHALL PROCEED UP TO THE LINES AND GRADES AS SHOWN ON THE DRAWINGS AND/OR AS DIRECTED BY THE AUTHORITY. BACKFILL AREAS WHICH SETTLE SHALL BE CORRECTED BY THE CONTRACTOR TO THE SATISFACTION OF THE AUTHORITY AT THE CONTRACTOR'S EXPENSE.

REMOVAL OF SHEETING - DURING BACKFILL OPERATIONS, NO SHEETING WHICH IS TO BE REMOVED SHALL EXTEND INTO THE BACKFILL WHICH IS BEING COMPACTED. THE SHEETING SHALL BE WITHDRAWN SO AS TO ALWAYS BE ABOVE THE BACKFILL. ANY VOIDS CREATED WHILE REMOVING SHEETING SHALL BE IMMEDIATELY CORRECTED BY THE CONTRACTOR BY FILLING WITH SELECT BACKFILL MATERIAL AND COMPACTING TO THE REQUIRED DENSITY TO THE SATISFACTION OF THE AUTHORITY AND AT THE CONTRACTOR'S EXPENSE.

PROTECTION - THE CONTRACTOR SHALL BE RESPONSIBLE FOR SAFEGUARDING ALL PIPES AND STRUCTURES BEING BACKFILLED, AND ANY DAMAGE OCCURRING TO SAME EITHER DURING THE BACKFILLING OPERATIONS OR AFTER THE BACKFILLING OPERATIONS HAVE BEEN COMPLETED SHALL BE CORRECTED BY THE CONTRACTOR TO THE SATISFACTION OF THE AUTHORITY, AT THE CONTRACTOR'S EXPENSE.

### F. SHEETING, SHORING AND BRACING

AT HIS OWN EXPENSE, THE CONTRACTOR SHALL FURNISH, INSTALL AND MAINTAIN SUCH SHEETING, SHORING, BRACING AND COFFERDAMMING, ETC., AS NEEDED TO SUPPORT THE SIDES AND ROOFS OF EXCAVATIONS AND TO PREVENT ANY EARTH OR ROCK MOVEMENTS WHICH MIGHT DIMINISH OR AFFECT THE NECESSARY WIDTH OF THE EXCAVATION, ENDANGER THE SAFETY OF PERSONS, INJURE OR DELAY THE WORK, OR JEOPARDIZE THE SAFETY OF ADJACENT PAVEMENTS, PROPERTY, BUILDINGS OR OTHER STRUCTURES. THE WORK OF SHEETING, SHORING AND BRACING SHALL, AT ALL TIMES. BE IN ACCORDANCE WITH THE REQUIREMENTS OF ALL AUTHORITIES HAVING JURISDICTION, INCLUDING OSHA IF REQUIRED BY THE AUTHORITY HAVING JURISDICTION, THE DESIGN SHALL BE SIGNED AND SEALED BY A LICENSED NYS PROFESSIONAL ENGINEER.

CONTRACTOR TO BE SOLELY RESPONSIBLE - THE CONTRACTOR SHALL BE ENTIRELY AND SOLELY RESPONSIBLE FOR THE ADEQUACY AND SUFFICIENCY OF ALL SUPPORTS AND OF ALL SHEETING, BRACING, SHORING, COFFERDAMMING, ETC. THE CONTRACTOR SHALL ASSUME ENTIRE AND SOLE LIABILITY FOR DAMAGES ON ACCOUNT OF INJURY TO PERSONS, ADJACENT PAVEMENTS, AND PUBLIC AND PRIVATE PROPERTY INCLUDING, BUT NOT LIMITED TO, THE WORK UNDER CONSTRUCTION, BUILDINGS, AND OTHER STRUCTURES, WHICH INJURY SHALL RESULT DIRECTLY OR INDIRECTLY FROM THE CONTRACTOR'S FAILURE TO INSTALL OR TO LEAVE IN PLACE ADEQUATE AND SUFFICIENT SUPPORTS, SHEETING, BRACING, SHORING, COFFERDAMMING, ETC.

### G. <u>DISPOSAL OF WATER</u>

GENERAL REQUIREMENTS - THE CONTRACTOR SHALL REMOVE, BY PUMPING OR OTHER MEANS APPROVED BY THE AUTHORITY, SURFACE OR GROUNDWATER WHICH ACCUMULATE IN EXCAVATIONS, AND HE SHALL AT ALL TIMES KEEP EXCAVATIONS DRY WHILE WORK IS BEING DONE IN THEM. THE WATER TABLE SHALL BE LOWERED BELOW THE BOTTOM OF THE PROPOSED EXCAVATION PRIOR TO MAKING EXCAVATIONS EXTENDING BELOW THE WATER TABLE. ANY SOIL DISTURBED AND WHICH BECOMES UNSTABLE FOR SUPPORT OF PIPES, FOUNDATIONS, STRUCTURES, ETC., SHALL BE REPLACED BY THE CONTRACTOR AS DIRECTED BY THE AUTHORITY WITH AN APPROVED AGGREGATE AT THE CONTRACTOR'S EXPENSE.

GRADING OF ADJACENT AREAS - AREAS ADJACENT TO ANY EXCAVATION SHALL BE GRADED SO AS TO PREVENT WATER FROM RUNNING INTO THE EXCAVATIONS.

METHOD OF DISPOSAL - THE WATER FROM THE EXCAVATIONS SHALL BE FILTERED. AND SHALL BE DISPOSED OF IN SUCH A MANNER AS WILL NOT CAUSE INJURY OR DAMAGE TO THE PUBLIC HEALTH, PUBLIC OR PRIVATE PROPERTY, NEARBY WATERCOURSES, DRAINAGEWAYS, WATER IMPOUNDMENT AREAS, THE WORK CONTEMPLATED OR IN PROGRESS, SURFACES OF THE STREETS, NOR CAUSE ANY INTERFERENCE WITH THE USE OF THE SAME. THE DISPOSAL OF THIS WATER SHALL BE DONE IN A MANNER SATISFACTORY TO THE AUTHORITIES HAVING JURISDICTION. OFF-SITE DISCHARGE SHALL COMPLY WITH ALL LOCAL, STATE AND FEDERAL REGULATIONS.

## V.STORM DRAINAGE

## A. <u>SCOPE</u>

THE CONTRACTOR SHALL PROVIDE ALL LABOR, PLANT, MATERIAL AND EQUIPMENT NECESSARY AND REQUIRED TO INSTALL ALL THE STORM DRAINAGE FACILITIES IN ACCORDANCE WITH THE CONTRACT DOCUMENTS. WORK SHALL INCLUDE, BUT NOT BE LIMITED TO. INSTALLATION OF THE DRAINAGE SYSTEM CONSISTING OF DRAINAGE STRUCTURES, PIPE AND ALL NECESSARY AND REQUIRED ACCESSORY ITEMS AND OPERATIONS, INCLUDING ALL CONNECTIONS AND INSTALLATION OF LEADER DRAINS.

WORK SHALL ALSO INCLUDE THE CONSTRUCTION OF THE DRAINAGE FACILITIES ASSOCIATED WITH THE WORK REQUIRED FOR THE RAILROAD TRACKS.

ALL SECTIONS OF THIS SPECIFICATION BELOW, SHALL HAVE METHODS AND MATERIALS APPROVED BY THE OWNER'S FIELD REPRESENTATIVE OR GEOTECHNICAL ENGINEER, HEREIN REFERRED TO AS THE 'AUTHORITY'.

ALL WORK SHALL BE AS APPROVED, AND PERFORMED TO THE SATISFACTION OF THE OWNER, OWNER'S FIELD REPRESENTATIVE, GEOTECHNICAL ENGINEER, OR THE AUTHORITY HAVING JURISDICTION.

PIPE SHALL BE OF THE TYPE AND SIZES SPECIFIED AND SHALL BE LAID ACCURATELY TO LINE AND GRADE. STRUCTURES SHALL BE ACCURATELY LOCATED AND PROPERLY ORIENTED. THE SECTIONS OF THESE SPECIFICATIONS ENTITLED "PIPE AND UTILITY STRUCTURES" AND "TRENCH EXCAVATION AND BACKFILL" SHALL APPLY TO THE WORK OF THIS SECTION. THE REQUIREMENTS OF THE HEALTH DEPARTMENT AND ANY OTHER AUTHORITY HAVING JURISDICTION SHALL GOVERN THE INSTALLATION, AND THE HORIZONTAL AND VERTICAL SEPARATION OF STORM DRAINS FROM WATER LINES.

LEADER DRAINS SHALL BE INSTALLED FROM THE DRAINAGE SYSTEM TO POINTS LOCATED FIVE (5) FEET OUTSIDE THE BUILDING LINES. WORK SHALL ALSO INCLUDE CONNECTIONS TO THE DRAINAGE SYSTEM AND CONNECTIONS TO THE WORK OF THE BUILDING PLUMBING CONTRACTOR. THE CONTRACTOR SHALL COORDINATE HIS WORK WITH THE WORK OF THE BUILDING PLUMBING CONTRACTOR TO DETERMINE THE EXACT LOCATION(S) AND ELEVATION(S) OF THE POINT(S) OF ENTRY INTO THE BUILDING.

THE MATERIALS TO BE USED IN THE CONSTRUCTION SHALL BE THOSE INDICATED ON THE DRAWINGS AND SPECIFIED HEREIN. THE CONTRACTOR SHALL SUPPLY TO THE OWNER'S FIELD REPRESENTATIVE. PRIOR TO INSTALLATION. CERTIFICATES OF COMPLIANCE FOR THE MATERIALS USED. THE CONTRACTOR SHALL ALSO SUBMIT SHOP DRAWINGS AND CATALOG CUTS OF ALL STORM DRAIN ITEMS AND APPURTENANCES (PIPE, FITTINGS, JOINTS, CASTINGS, STEPS, PRECAST CONCRETE STRUCTURES, ETC.) TO THE SITE ENGINEER FOR REVIEW PRIOR TO ORDERING. PIPE AND JOINTS SHALL BE AS INDICATED IN THE UTILITY NOTES. STRUCTURES SHALL BE AS SPECIFIED IN THE SECTION OF THESE SPECIFICATIONS ENTITLED "PIPE AND UTILITY STRUCTURES". WHERE MATERIAL REQUIREMENTS SPECIFIED HEREIN

CONFLICTS WITH THE REQUIREMENTS OF AUTHORITIES HAVING JURISDICTION, THE

REQUIREMENTS OF THE AUTHORITY HAVING JURISDICTION SHALL GOVERN.

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