NORTHWESTERN UNIVERSITY
PROJECT NAME _____ FOR: _____
JOB # _____ ISSUED: 11/06/2018

2$ PVC T9/ - PSM S- ' -% P(/() *618!()54 &) , .&%* -%:

&$ P(/ -: ASTM F 6AH6 T!1 ' &.. 34(5<) -++6 : -.. &) , +/(*03 20% *&+<-3- , =0()3+$
:$ F(33() *+: ASTM F6AH
5$ #&+<-3+: ASTM F ?AA6 -.&+308 -%(5 +-&.+$

$ PVC P%-++7%- P(/() *:

&$ P(/ -: AWWA CH006 C.&++ 1@0 C.&++ 200 PVC /(/ - '(34 : -..!&) , +/(*03 -) , + 20% *&+<-3- , =0()3+$
:$ F(33() *+: AWWA CH006 C.&++ 1@0 C.&++ 200 PVC /(/ - '(34 : -.. -) , +$
5$ #&+<-3+: ASTM F ?AA6 -.&+308 -%(5 +-&.+$
,$ D753(.-!I%0)6 C08 /&53 F(33() *+: AWWA C1@ 6 20% /

J$ C.-&)073+:

'(34 & 8()(878 7)->/&),-, 1-%3(5&. 4-(*43 02 8 ()54-+6 & 8()(878 34(5<)-++ 02 /16 ()546 5&/&:.- 02 ->/&),()*)03 .-++ 34&) 2 ()54-+ 1-%3(5&..9 '4-) ()+3&..-,$

1$ S5%- '+6 :0.3+ &),)73+: S3&().-++ +3--.6 ASTM F!@H &), @H? T9/- 0?$
2$ E>/&)+(0) B&),+ +4&.. :-16 *&7*- 34(5<)-++6 1! /? ()54-+ '(,- &), 8&,- 02 +3&().-++ +3--. 8--3()* 34- %-;7(%-8-)3+ 02 ASTM A2?06 T9/- 0?$

O$ P%03-53(1- C0&3()*+: O)-! 0% 3'0!50&36 50&.!3&% -/0>9I 1@!8(. 8()(878 34(5<)-++6 7).-++ 034-%'(+- (),(5&3-,I 2&530%9 0% 2(-., &//.(-, 30 34- ->3-%(0% &), ()3-%(0% +7%2&5-+$

P$ M&)40.- C4&))-.+ &), B-)54-+: F&530%9 0% 2(-., 20%8-, 2%08 50)5%-3-$ P0%3.&), 5-8-)3 ,-+(*) 8(>6 ?000 /+(8()(878$ I)5.7,- 54&))-.+ &), :-)54-+ () 8&)40.-+$

1$ C4&))-.+: C0)5%-3- ()1-%36 20%8-, 30 +&8- '(,34 &+ 50))-53-, /(/()*6 '(34 4-(*43 02 1-%3(5&. +(,-+ 30 34%--!207%34+ 02 /(/- ,(&8-3-%$ F0%8 57%1-, 54&))-.+ '(34 +8 00346 7)(20%8 %&,(7+ &), +.0/-$
2$ I)1-%3 S.0/-: 1 /-%5-)3 34%07*4 8&)40.-$
$ B-)54-+: C0)5%-3-6 +.0/-, 30 ,%&() ()30 54&))-.$
?$ S.0/-: 8 /-%5-)3$

PART 3 - EMECUTION

$1 EARTHWORK

A$ R-2-% 30 S-53(0) 12000 LE&%34 M01()*L 2O% ->5&1&3()*6 3%-)54()*6 &), :&5<2(..()*$

$2 UTILITY LOCATION

A$ P%(0% 30 &)9 73(.(39 ()+3&..&3(0) '0%< 5088-)5()*6 C0)3%&530% +4&.. 5&.. JULIE / 0)-!5&.. I..()0(+ .05&3-$

$ INSPECTIONS

A$ I)+/-53 &), %-/0%3 0) 34- ()3-%(0% 02 /(/()* 30 ,-3-%8()- '4-34-% .()-,(+/.&5-8-)3 0% 034-% ,&8&*- 4&+ 0557%%-,$ I)+/-53(0) +407., 0557% &23-% &//%0>(8&3-.9 2? ()54-+ 02 :&5<2(.. (+ () /.&5-6 &), &*&() &3 5088/.-3(0) 02 P%0=-53$

1$ C0)3%&530% +4&.. +7:8(3+-/&%&3- %-/0%3 20% -&54 +9+3-8 ()+/-53(0)$
2$ D-2-53+ %-;7(%()* 50%%-53(0) ()5.7,- 34- 20..0'()*:

&$ A.(*)8-)3: L-++ 34&) 27.. ,(&8-3-% 02 ()+(,- 02 /(/- (+ 1(+(:.- :-3'--) +3%7537%-+$
:$ D-2.-53(0): F.->(:.- /(/()* '(34 ,-2.-53(0) 34&3 /%-1-)3+ /&++&*- 02 :&.. 0% 59.(),-% 02 +(J-)03 .-++ 34&) H2$@ /-%5-)3 02 /(/()* ,(&8-3-%$
5$ D&8&*-: C%7+4-,6 :%0<-)6 5%&5<-,6 0% 034-%'(+- ,&8&*-, /(/()*$
,$ I)2(.3%&3(0): W&3-%.-&<&*- ()30 /(/()*$
-$ E>2(.3%&3(0): W&3-%.-&<&*- 2%08 0% &%07), /(/()*$

$ C0)3%&530% +4&.. %-/.&5-,-2-53(1- /(/()* 7+()*)-' 8&3-%(&.+6 &), %-/-&3 ()+/-53(0)+ 7)3(. ,-2-53+ &%-'(34() &..0'&)5-+ +/-5(2(-,$
?$ C0)3%&530% +4&.. %-()+/-53 &), %-/-&3 /%05-,7%- 7)3(. %-+7.3+ &%- +&3(+2&530%9$

$? PREPARATION

A$ S&)(3&%9 +- ' -% /(/-+:

1$ R-2-% 30 S-53(0) 1 20 006 E&%34 M01()*6 %-;7(%-8-)3+$
2$ F0% &.. %(*(, /(/-()+3&..&3(0)+6 34- '(,34 02 34- 3%-)54 &3 34- 30/ 02 34- /(/-+4&..)03 ->5--, 34- 073+(,- /(/-,(&8-3-%6()5.7,()* :-..+6 /.7+ 34- 5.-&% '(,34 0) -&54 +(,- 02 34- /(/-&+ .(+3-, () T&:.- 0 00!1:

Table 33 30 00-1	
P(/-S(J- E()F	M&>(878 C.-&% W(,34 E()F
6 " 2?	12
2A " @?	1@
60 &), 01-%	2?

$ F0% &..)0)!%(*(, /(/-()+3&..&3(0)+6 34- 8()(878 3%-)54 '(,34 +4&.. :- /-% 34- /(/-8&)72&537%-%N+ %-5088-),&3(0)+6 :73 &3)03(8-+4&..34- '(,34 :-.-++ 34&) 34&3 +/-5(2(-, () ASTM D2 21$
?$ T4-.-)*34 02 3%-)54 0% 37))-.0/-) &3 &)90)-3(8-+4&..50)20%8 30 34-.(8(3+ &//%01-, :9 NU$ I) *-)-%&.6)03 80%- 34&) 100 2--3 02 3%-)54 +4&.. :-0/-)-, () &,1&)5- 02 34- 508/.-3-, '0%<$
@$ W4-%- 34- +-'-% /(/-+ &%- :7(.3 7/0) 34- +7%2&5- 02 34- *%07),6 34- +7%2&5- +4&.. :-*%7::-, &), 5.-&%-, 02 &.. +378/+6 *%&++6 875<6 0% 034-%1-*-3&:.- 8&33-%$
6$ P(/-+ +4&..)03 :- 50)+3%753-, 0) 2%0J-) *%07),$

B$ M&)40.-+:

1$ R-2-% 30 S-53(0) 1 20 006 E&%34 M01()* %-;7(%-8-)3+$

$@ SANITARY SEWER PIPE INSTALLATION

A$ P(/-+4&.. :-.&(, &557%&3-.9 30 34- .()-&), *%&,-,-+(*)&3-, 0) 34- C0)3%&53 D%&'()*+$ P(/-+4&.. :- 5&%-27..9 5-)3-%-, +0 34&3 '4-).&(, (3 '(.. 20%8 & +-'-% '(34 5.0+- 2(33()* =0()3+ &), & 7)(20%8 ()1-%3$

B$ A.. /(/-+4&.. :-*() &), -), '(34 /(/-,+ &+)0%8&..9 2&:%(5&3-, :9 34- 8&)72&537%-%+$ I2 2(-., 5733()* /(/-(+ %-;7(%-,6 5733()* +4&.. :-/-%20%8-, :9 34- 7+- 02 300.+ 0% -;7(/8-)3 34&3 '(../%01(,-&)-&3 /-%/-),(57.&% 573 '(34 &:-1-.-, -), '(3407 3 +3%7537%&., &8&*- 30 34- /(/-'&.. 0% ,&8&*- 30 50&3()*+ 0% 2(..-%+$

C$ F0% D753(.- I%0) /(/-+:

1$ I)+3&..&3(0) 02 ,753(.- (%0) /(/-+ +4&.. 50)20%8 30 AWWA C600 7).-++ 034-%'(+-)03-, 0) C0)3%&53 D0578-)3+$
2$ R-801-&), %-/.&5-, -2-53(1-/(-5-+$
$ C.-&% 02 &.. ,-:%(+&), ,(%3 :-20%-()+3&..()*&), <--/5.-&) 7)3(.&55-/3-,$
?$ F0% /7+4!0) =0()3+6 5.-&) :-.. 02 ->5-++ 3&% 0% 034-% 0:+3%753(0) &), '(/-073 :-20%-()+-%3()*)->3 /(/-+/(*03$ S401-/(/-()30 /.&5- 7)3(./%0/-%.9 +-&3-, &), 40., +-57%-.9 7)3(.=0()3 508/.-3-,$

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2$ F0% %-()20%5-, 50)5%-3- /(/- 2A!()54 ,(&8-3-% 0% .&%*-%6 (),(1(,7&. =0()3 3-+3()* +4&.. 50)20%8 '(34 ASTM C110 $

C$ H9,%0+3&3(5 T-+3+: C0)3%&530% +4&.. 3-+3 +&)(3&%9 +-'-%&*- &550%,()* 30 %-;7(%-8-)3+ 02 &7340%(3(-+ 4&1()* =7%(+,(53(0) &), /-% E>2(.3%&3(0) &), I)2(.3%&3(0) M-340, P%05-,7%-+ /-% 34-S3&),&%, S/-5(2(5&3(0)+ 20% W&3-% &), S-'-% C0)+3%753(0) () I..()0(+ .&3-+3 -,(3(0) '4-%-)0 +-/&%&3- '%(33-) +3&),&%,+ ->(+3$

D$ F0%5- M&(): P-%20%8 49,%0+3&3(5 3-+3 &23-% 34%7+3 :.05<+6 +7//0%3+6 &), &)540%+ 4&1- 4&%,-)-,$ T-+3 &3 /%-++7%-)03.-++ 34&) 1!1/2 3(8-+ 34- 8&>(878 +9+3-8 0/-%&3()* /%-++7%-6 :73)03.-++

2?					2?$0H2	22$88A
2A					2A$1@2	2@$AH?
					T!2	
18					18$202	1A$2H2
21					21$?@H	20$ 86
2?					2?$1?2	22$H @
2A					2A$208	2@$8?8

?$ A.. /0%3(0)+ 02 +-'-% 207), 30 ->5--, 34(+ .(8(3 +4&.. :- %-/.&5-, 0% %-/&(%-, :9 CONTRACTOR /%08/3.9 () & 8&))-%+&3(+2&53O%9 30 NU$ A23-%& /-%(0, 02 &3.-&+3 60 ,&9+ &23-% :&5<2(..()* 34- %-/&(%-, &%-&E+F6 34- +-'-% +4&.. &*&() :- 3-+3-, 20% ,-2.-53(0)$ T4(+ /%05-,7%- +4&.. :-%-/-&3-, &+)-5-++&%9 7)3(. 34- 8&>(878 /(/- ,-2.-53(0) (+ @ /-%5-)3 0% .-++$ CONTRACTOR +4&.. :-&% 34- 303&. 50+3 02 &.. %-/&(%+ 0% %-/.&5-8-)36 ()5.7,()* +7%2&5- %-+30%&3(0) () &550%,&)5-'(34 S-53(0) 01 A? 006 C.-&)()*$

J$ C.0+-, C&/3(0) T-.-1(+(0) ECCTVF I)+/-53(0):

1$ A..+-'-%+6 8&)40.-+6 ().-3+ &), 034-%&//7%3-)&)5-+ +4&.. :-+7:=-53 30 CCTV &), 1(+7&. ()+/-53(0)+6 30 :- /-%20%8-, :9 CONTRACTOR6 /%(0% 30 S7:+3&)3(&. C08/.-3(0) 02 34-+-'-% (3-8+$ N0 %-;7-+3 :9 CONTRACTOR 20% '&(1-% 02 34- ()+/-53(0)+ '(.. :-50)+(,-%-,$

2$ T4- CCTV ()+/-53(0)+ +4&.. :- /-%20%8-, &23-% 508/.-3(0) 02 34- +-'-% (3-8+6 :-20%- 34- S7:+3&)3(&. C08/.-3(0) &), %-.-&+- 02 34- %-3&()-% 0% :0),$ CONTRACTOR +4&.. 1-%(29 34&3 34- +-'-%+ &), 8&)40.-+ &%- +7:+3&)3(&..9 508/.-3- &), %-&+0)&:.9 5.-&) /%(0% 30 /-%20%8()* 34- ()+/-53(0)$

$ CCTV ()+/-53(0)+ +4&.. :- /-%20%8-, () &550%,&)5-'(34 N&3(0)&. A++05(&3(0) 02 S-'-% S-%1(5- C08/&)(-+ ENASSCOF P(/-.()- A++-++8-)3 C-%3

$H FIELD PAINTIN#/COATIN#S

A$ R-/&(% &)9+40/ /&()3()*/50&3()*+ ,&8&*-, ,7%()* +30%&*- 0% ()+3&..&3(0) 30 NU%+ +&3(+2&53(0)$

$10 ADJUSTIN#

A$ C00%,()&3- '(34 NU 20% &)9 2(-., &,=7+38-)3+$ NU %-+-%1-+ 34- %(*43 30 %-=-53 &)9 2(-., &,=7+38-)3+$

$11 PROTECTION

A$ P%03-53 +&)(3&%9 +-'-%+ 2%08 ,&8&*- 34%07*4073 +