

Ordinance No. 12-1-2000

(E)

**AN ORDINANCE AMENDING THE ZONING MAP OF SANTAQUIN CITY
TO INCLUDE THE SOUTH COUNTY II ANNEXATION AREAS
LOCATED ADJACENT TO THE CURRENT CORPORATE BOUNDARIES
OF SANTAQUIN CITY, UTAH**

WHEREAS, Summit Ridge Development, LLC; South County Development, L.C.; Shirl Ekins, as Trustee of the Shirl L. Ekins Family Trust; Lori Ann Dunn, as Trustee of the Shirl L. Ekins Family Irrevocable Trust; School and Institutional Trust Lands Administration; and Willis H. Morgan petitioned to annex the real property comprising the Summit Ridge Development project to the City; and

WHEREAS, the petitions were signed by a majority of the owners of property within the annexation area; and

WHEREAS, the applicable public entities in Utah and Juab Counties have received notice of the proposed annexation and amendment to the official zone map; and

WHEREAS, on June 14, 2000, the City Council held a public hearing to receive input on the proposed annexation and zoning; and

WHEREAS, Ordinance No. 6-2-2000, adopted by the City Council on June 28, 2000 to amend the Official Zone Map to include the property within the City's boundary, became null and void on September 1, 2000 due to the failure of the parties to execute the "Summit Ridge Annexation and Development Agreement" by that date; and

WHEREAS, all parties except Santaquin City have now executed the Summit Ridge Annexation and Development Agreement; and

WHEREAS, Santaquin City, Utah desires to amend the Official Zone Map of Santaquin City to include the property within the City's regulatory boundary.

NOW, THEREFORE BE IT ORDAINED by the City Council of Santaquin City, Utah as follows:

SECTION 1. Official Zone Map Amended. The Official Zone Map of Santaquin City as adopted by section 02.0802 of the Santaquin City Zoning Ordinance, is hereby amended to include the annexed Summit Ridge Development project as depicted in Exhibit A.

SECTION 2. Designation. The amended area, as shown on exhibit A, shall be zoned Planned Community (PC).

SECTION 3. Execution of Agreement. The Mayor is hereby authorized to execute the "Summit Ridge Annexation and Development Agreement," a copy of which is attached as Exhibit B, the "Memorandum of Annexation and Development," a copy of which is attached as Exhibit C, and the "Master Declaration of Covenants, Conditions and Restrictions and Reservation of Easements," a copy of which is attached as Exhibit D.

SECTION 4. Posting. A copy of this ordinance shall be deposited in the office of the Santaquin City Recorder, and on or before December 11, 2000, the Santaquin City Recorder shall certify that this Ordinance has been posted in three public places within the municipality, as provided in Utah Code Annotated § 10-3-711(1).

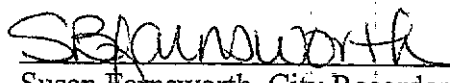
SECTION 5. Effective Date. This Ordinance shall take effect on December 15, 2000.

PASSED AND ADOPTED this 6th day of December, 2000.

SANTAQUIN CITY
MUNICIPAL CORPORATION


LaDue Scovill, MAYOR

ATTEST:


Susan Farnsworth, City Recorder

NOTICE

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POSTING OF ORDINANCE 12-1-2000 (AN ORDINANCE AMENDING THE ZONING MAP OF SANTAQUIN CITY TO INCLUDE THE SOUTH COUNTY II ANNEXATION AREAS LOCATED ADJACENT TO THE CURRENT CORPORATE BOUNDARIES OF SANTAQUIN CITY, UTAH)

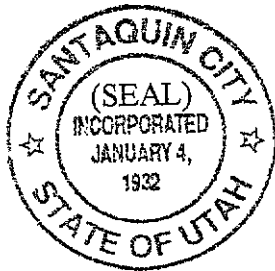
ALL EXHIBITS AND ATTACHMENTS TO THE ORDINANCE ARE AVAILABLE AT THE CITY OFFICE, 45 WEST 100 SOUTH, SANTAQUIN DURING REGULAR BUSINESS HOURS.

CERTIFICATE OF POSTING

STATE OF UTAH)
)
COUNTY OF UTAH)

I, **SUSAN B. FARNSWORTH**, City Recorder of Santaquin City, do hereby certify and declare that the above and forgoing is a true, full, and correct copy of Ordinance 12-1-2000, passed by the City Council of Santaquin City, Utah, on the 6th day of December, 2000, entitled "AN **ORDINANCE AMENDING THE ZONING MAP OF SANTAQUIN CITY TO INCLUDE THE SOUTH COUNTY II ANNEXATION AREAS LOCATED ADJACENT TO THE CURRENT CORPORATE BOUNDARIES OF SANTAQUIN CITY, UTAH.**"

IN WITNESS WHEREOF, I have hereunto set my hand and affixed the Corporate Seal of Santaquin City, Utah this 11th day of December, 2000.



S B Farnsworth

Susan B Farnsworth, City Recorder

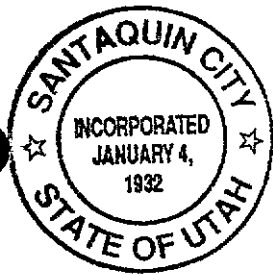
POSTING
City Office
Post Office
Zions Bank

STATE OF UTAH)
) ss.
COUNTY OF UTAH)

ENT 102458:2000 PG 5 of 480

I, SUSAN FARNSWORTH, City Recorder of Santaquin City, Utah, do hereby certify and declare that the above and foregoing is a true, full, and correct copy of an ordinance passed by the City Council of Santaquin City, Utah, on the 6th day of December, 2001, entitled "AN ORDINANCE AMENDING THE ZONING MAP OF SANTAQUIN CITY TO INCLUDE THE SOUTH COUNTY II ANNEXATION AREAS LOCATED ADJACENT TOT HE CURRENT CORPORATE BOUNDARIES OF SANTAQUIN CITY, UTAH."

IN WITNESS WHEREOF, I have hereunto set my hand and affixed the Corporate Seal of Santaquin City, Utah this 21st day of December, 2000.



(SEAL)

SBFarnsworth

SUSAN FARNSWORTH
Santaquin City Recorder



Consulting Engineers and Surveyors, Inc.

3302 N. Main Street, Spanish Fork, UT 84660 (801) 798-0555 Fax: (801) 798-9393 E-Mail: office@lei-eng.com

LEGAL DESCRIPTION
PREPARED FOR
SUMMIT RIDGE
(SANTAQUIN, UTAH)
(revised 12/11/00)

WEST PARCEL

Beginning at the Southeast Corner of Section 16, Township 10 South, Range 1 East, Salt Lake Base & Meridian; thence $S89^{\circ}46'12''W$ along the Section line 2621.27 feet to the South $\frac{1}{4}$ Corner of Section 16; thence $S89^{\circ}46'13''W$ along the Section line 2621.01 feet to the Southwest Corner of Section 16; thence $N0^{\circ}33'02''W$ along the Section line 2677.35 feet to the West $\frac{1}{4}$ Corner of Section 16; thence $N4^{\circ}36'19''W$ along the Section line 2643.61 feet to the Southwest Corner of Section 9; thence $N0^{\circ}56'29''W$ along the Section line 2627.55 feet to the West $\frac{1}{4}$ Corner of Section 9; thence $N0^{\circ}54'43''W$ along the Section line 2629.64 feet to the Southwest Corner of Section 4; thence $N0^{\circ}11'38''W$ along the Section line 2684.79 feet to the West $\frac{1}{4}$ Corner of Section 4; thence $N89^{\circ}23'49''E$ along the $\frac{1}{4}$ Section line 2656.93 feet to the Center of Section 4; thence $S0^{\circ}12'46''E$ along the $\frac{1}{4}$ Section line 2640.84 feet to the North $\frac{1}{4}$ Corner of Section 9; thence $N89^{\circ}20'52''E$ along the Section line 2692.74 feet to the Southwest Corner of Section 3; thence $N0^{\circ}40'50''W$ along the Section line 1319.24 feet; thence $N89^{\circ}49'45''E$ 1316.48 feet; thence $S0^{\circ}35'46''E$ 441.35 feet; thence $N89^{\circ}42'00''E$ along a fenceline 600.00 feet; thence $N89^{\circ}43'00''E$ along a fenceline 866.00 feet; thence $S89^{\circ}39'00''E$ 119.27 feet to the westerly right-of-way line of the Union Pacific Railroad; thence Southwesterly along the arc of a 1965.00 foot radius non-tangent curve (radius bears: $S57^{\circ}42'49''E$) 499.98 feet through a central angle of $14^{\circ}34'42''$ (chord: $S24^{\circ}59'50''W$ 498.63 feet); thence $S89^{\circ}03'00''W$ 52.70 feet; thence Southwesterly along the arc of a 2015.00 foot radius non-tangent curve (radius bears: $S72^{\circ}46'17''E$) 447.70 feet through a central angle of $12^{\circ}43'48''$ (chord: $S10^{\circ}51'49''W$ 446.77 feet); thence $S89^{\circ}55'46''E$ along the Section line 50.15 feet to a point located $N89^{\circ}55'46''W$ 36.08 feet from the North $\frac{1}{4}$ Corner of Section 10; thence Southwesterly along the arc of a 1965.00 foot radius non-tangent curve (radius bears: $S85^{\circ}23'19''E$) 107.28 feet through a central angle of $3^{\circ}07'41''$ (chord: $S3^{\circ}02'51''W$ 107.27 feet); thence $S1^{\circ}29'00''W$ 377.70 feet; thence along the arc of a 2855.00 foot radius curve to the right 322.59 feet through a central angle of $6^{\circ}28'26''$ (chord: $S4^{\circ}43'13''W$ 322.42 feet); thence $N86^{\circ}30'00''W$ 30.09 feet; thence Southwesterly along the arc of a 2825.00 foot radius non-tangent curve

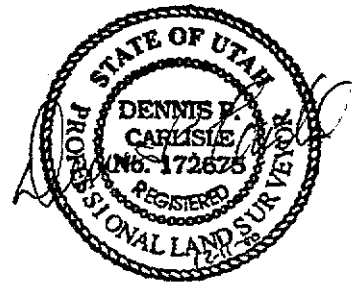


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(radius bears: N81°59'43"W) 495.91 feet through a central angle of 10°03'28" (chord: S13°02'01"W 495.27 feet); thence S18°03'45"W 60.75 feet, the previous 10 (ten) courses along said right-of-way; thence West 1059.13 feet; thence South 2,640.00 feet; thence East 626.87 feet to the westerly right-of-way line of the Union Pacific Railroad; thence N87°51'23"E 200.39 feet to the easterly right-of-way of said Railroad; thence S1°26'00"W along said right-of-way 5371.43 feet; thence N64°07'19"W 67.13 feet; thence N61°08'00"W 47.10 feet; thence N60°48'41"W 83.05 feet; thence N62°24'35"W 26.28 feet to said westerly right-of-way; thence N62°24'35"W 179.92 feet; thence N67°55'10"W 285.97 feet; thence N76°39'17"W 140.80 feet; thence S87°08'15"W 80.10 feet; thence N68°32'14"W 113.09 feet; thence N67°00'36"W 48.34 feet; thence N62°08'32"W 94.16 feet; thence N61°34'44"W 48.32 feet; thence N41°02'50"W 90.99 feet; thence N45°34'02"W 89.28 feet; thence N33°28'51"W 82.55 feet; thence N33°17'14"W 117.98 feet; thence N35°51'49"W 155.33 feet; thence N31°19'11"W 201.03 feet; thence N36°31'35"W 396.51 feet; thence N31°23'47"W 67.52 feet; thence N89°42'18"W along the Section line 62.48 feet to the East ¼ Corner of Section 16; thence S1°26'07"E along the Section line 2725.41 feet to the point of beginning.

Contains: 1,898.82 acres



ANNEXATION AND DEVELOPMENT AGREEMENT FOR SUMMIT RIDGE

THIS ANNEXATION AND DEVELOPMENT AGREEMENT for Summit Ridge (the "Agreement") is entered into as of the 6 day of December, 2000 by and among Summit Ridge Development, LLC, a Utah limited liability company ("Summit Ridge" or "Developer") and Santaquin City, a third class city of the State of Utah ("City" or "Santaquin"), and South County Development, L.C., a Utah limited liability company ("South County"), Shirl L. Ekins as Trustee of the Shirl L. Ekins Family Trust (the "Ekins Family Trust"), Lori Ann Ekins Dunn as Trustee of the Shirl L. Ekins Family Irrevocable Trust (the "Ekins Family Irrevocable Trust"), UTAH S.H.O.P., LLC, a Utah limited liability company ("Shop"), Daryl J. and Darlene Kay, Trustees of the Daryl J. Kay Family Trust (the "Kay Family Trust"), Willis H. and Coy Morgan ("Morgan") and the State of Utah acting through the School and Institutional Trust Lands Administration ("SITLA") (all together, the "Parties").

RECITALS

A. WHEREAS, the Parties intend to enter into this Agreement to establish annexation and development parameters for certain property described in Exhibit A attached hereto (hereafter, the "Summit Ridge Project Area") and depicted on the Summit Ridge Development Plan attached hereto as Exhibit B.

B. WHEREAS, the Owners (defined below) are each a present owner of a portion of the Summit Ridge Project Area and by their signatures on this Agreement authorize Developer to apply for and obtain from the City development entitlements and guidelines for the Summit Ridge Project Area.

C. WHEREAS, the Owners have each agreed to cooperate with Developer and the City as reasonably necessary to obtain the development entitlements set forth in this Agreement, and have agreed to be bound by the terms of this Agreement, as evidenced by their signatures below.

D. WHEREAS, approximately 367.38 acres of land within the Summit Ridge Project Area was annexed into the City on December 17, 1996 by Resolution 12-2-96 (recorded on January 10, 1997), which property is more particularly described on Exhibit C attached hereto (the "Annexed Parcels").

E. WHEREAS, Developer and Owners have filed the Annexation Application with the City for the remainder of the Summit Ridge Project Area.

F. WHEREAS, on June 28, 2000, the City Council unanimously adopted Ordinance 6-2-2000 to conditionally accept the annexation of the Summit Ridge Project Area, also known as the South County II Addition, and on 6 Dec 2000 removed all conditions to the annexation and resolved to annex the Summit Ridge Project Area.

G. WHEREAS, the Parties intend to take all steps necessary to finalize the annexation and zoning of the Summit Ridge Project Area, including the Annexed Parcels, and to develop the Summit Ridge Project Area according to this Agreement.

NOW, THEREFORE, in consideration of the foregoing recitals and the covenants hereafter set forth, the sufficiency of which the Parties hereby acknowledge, the Parties agree as follows:

SECTION I. DEFINITIONS

Unless the context requires a different meaning, any term or phrase used in this Agreement that has its first letter capitalized shall have that meaning given to it by the Santaquin Zoning Ordinance in effect on the date of a complete application or, if different, by this Agreement. Certain such terms and phrases are referenced below; others are defined where they appear in the text of this Agreement.

1.1 **"After-Acquired Properties"** means those properties outside of the Summit Ridge Project Area acquired by Developer after the execution of this Agreement which are adjacent to the Summit Ridge Project Area and at a later date are subjected to this Agreement with the consent of the City.

1.2 **"Annexation Application"** means those certain applications for annexation to the City of the Summit Ridge Project Area submitted to the City by Developer and the Owners.

1.3 **"Annexed Parcels"** means that approximately 367 acres of property included within the Summit Ridge Project Area and already annexed into the City, as more particularly described on Exhibit C attached hereto.

1.4 **"Applicant"** has the meaning set forth in Section 3.2.2.

1.5 **"City's Standards and Specifications for Public Improvements"** means those standards and specifications of the City to be approved by the City September 6, 2000, a copy of which is attached hereto as Exhibit G.

1.6 **"Commercial Uses"** shall include industrial, neighborhood convenience, sales and other commercial uses, excluding multi-family uses.

1.7 **"Continuing Owner"** means any Owner (and its successors and assigns) who has not yet sold or contracted with Summit Ridge for purchase of its property. At the time any Owner enters into a contract with Summit Ridge for sale of all of its property, it ceases to be a Continuing Owner; provided that in the event (i) either (a) the sale of any portion of Owner's property to Summit Ridge has not closed, or (b) any portion of Owner's property is reacquired by Owner (or its successors or assigns) through foreclosure, forfeiture, or repossession, and (ii) Owner (or its successor(s) or assign(s) or any of them) files any application for development of any portion of Owner's property, Owner (or its successors or assigns) immediately and automatically regains the status of a Continuing Owner. Unless specifically provided otherwise herein, all rights and obligations of Developer herein shall also mean the right and obligation of each Continuing Owner with respect to the specific parcel of property owned by such Continuing Owner (or application filed by such Continuing Owner); provided that in that case, Summit Ridge shall not be responsible for any obligation specific to such Continuing Owner or its property or application.

1.8 **"Covenants, Conditions and Restrictions"** means that certain Master Declaration of Covenants, Conditions and Restrictions and Reservation of Easements for Summit Ridge (the "Master Declaration"), a copy of which is attached as Exhibit D hereto.

1.9 **“Density Transfer”** means the ability of the Developer to transfer densities from areas within the Summit Ridge Project Area to other areas within the Summit Ridge Project Area.

1.10 **“Design Guidelines”** means The Summit Ridge Design Guidelines (including the Landscape Plan) adopted by the Developer and as approved by the City, a copy of which is included in Exhibit E attached hereto.

1.11 **“Developer”** means Summit Ridge Development, LLC, its assigns and successors in interest, whether in whole or in part. Developer shall cause its employees and agents to act in accordance with the terms of this Agreement. For the limited purpose of specifying rights and obligations under this Agreement, references to Developer shall include Continuing Owners as set forth in Sections 1.7 and 6.13 below.

1.12 **“Development Phase”** means each portion of the Summit Ridge Project Area for which a separate subdivision application is filed hereunder.

1.13 **“Development Guidelines”** means the Master Declaration attached hereto as Exhibit D, and the Design Guidelines and separate plans, including the Culinary and Secondary Water Plans, the Sewer and Storm Water Management Plans, the Public Amenities Plan and the Affordable Housing Plan, all of which are attached hereto together as Exhibit E.

1.14 **“ERUs”** has the meaning set forth in Section 3.2.2.

1.15 **“Multi-Family Uses”** shall include all permitted residential uses other than single family detached housing, including without limitation condominiums, town homes, stacked flats and apartment complexes. Notwithstanding the foregoing, duplexes, twin homes, and fourplexes shall not be permitted within the Project without consent of the City.

1.16 **“Ordinance”** means Santaquin Ordinance No. 5-2-2000 adding Section 02.0922 to the Santaquin City Zoning Ordinance to regulate any Planned Community District created thereunder.

1.17 **“Owners”** means collectively South County, the Ekins Family Trust, the Ekins Family Irrevocable Trust, Shop, the Kay Family Trust, Morgan and SITLA, who together with Developer, own all of the land in the Summit Ridge Project Area. Any Owner may hereafter be referred to individually as “Owner”.

1.18 **“Planned Community Program”** means that certain Planned Community Program for the Summit Ridge Project Area and associated public improvements approved by the City and consisting of the Summit Ridge Development Plan and Development Guidelines.

1.19 **“Planning Commission”** shall mean the Santaquin City Planning Commission.

1.20 **“Project”** means the improvement and development of the Summit Ridge Project Area pursuant to the Planned Community Program.

1.21 **“SITLA Property”** means that unimproved real property owned by SITLA and more particularly described on the attached Exhibit A-1.

1.22 **“Summit Ridge Development Plan”** means that map attached hereto as Exhibit B, which constitutes the Development Plan as required by the Ordinance.

1.23 **"Summit Ridge Plat"** means the final annexation plat of the Summit Ridge Project Area to be filed with the City or recorded in the official public records in connection with this Agreement.

1.24 **"Summit Ridge Project Area"** means the real property described or depicted on the attached Exhibits A and B; provided that in the event SITLA does not execute this Agreement or an amendment hereto, the SITLA Property shall not be a part of the Summit Ridge Project Area.

SECTION II. PLANNED COMMUNITY - SUMMIT RIDGE

2.1 **Designation as Planned Community District.** In compliance with the requirements of Utah Code Ann. § 10-9-401 et. seq. and following a public hearing conducted by the City on May 17, 2000, at which the City, pursuant to its legislative authority, adopted the Ordinance, the City hereby designates the Summit Ridge Project Area as a Planned Community District. The Planned Community Program is consistent with the requirements of the Santaquin City Code for a Planned Community District, sets forth densities, location of densities and Developer-offered amenities and is subject to all normally-applicable City processes. The following are hereby also made a part of this Agreement:

- 2.1.1 The Design Guidelines;
- 2.1.2 The Covenants, Conditions and Restrictions;
- 2.1.3 The Sewer and Storm Water Management Plans;
- 2.1.4 The Public Amenities Plan;
- 2.1.5 The Culinary and Secondary Water Plans;
- 2.1.6 The Affordable Housing Plan; and
- 2.1.7 The City's Standards and Specifications for Public Improvements.

2.2 **Summit Ridge Development Guidelines.** Upon annexation, the Summit Ridge Project Area shall become part of Santaquin City. All development or improvement of any sort whatsoever within the Summit Ridge Project Area shall therefore comply with the applicable ordinances, standards, regulations, requirements, and procedures established by and for Santaquin City.

The zoning for the Annexed Parcels shall be changed to be that shown on the Summit Ridge Development Plan and the remainder of the Summit Ridge Project Area shall be zoned as shown on the Summit Ridge Development Plan. The following development standards apply to the Summit Ridge Project Area:

2.2.1 **Maximum Development Area.** In the Planned Community process, the entire Summit Ridge Project Area shall be contained within the property described on Exhibit A, unless expanded to include After-Acquired Property with the consent of the City.

2.2.2 **Permitted Residential Density.** The permitted residential density within the Summit Ridge Project Area prior to the addition of any After-Acquired Property and including the SITLA Property is 3,322 residential units.

2.2.3 Commercial Density. The Summit Ridge Project Area may additionally include up to 1,800,000 sq. ft. of Commercial Uses as set forth on the Summit Ridge Development Plan. The City specifically acknowledges that, upon Developer's successful completion of all requirements and obligations herein, Developer shall be entitled to not less than 1,800,000 square feet of Commercial Uses within the Summit Ridge Project Area prior to the addition of any After-Acquired Property.

2.2.4 Phasing. The City acknowledges that Developer intends to submit multiple applications from time to time to develop and/or construct portions of the Planned Community Program in Development Phases. The timing of those phases shall be determined by Developer in its sole business judgment and discretion. However, to coordinate the City-provided services and facilities and services and facilities provided by other public agencies with the demand for public services and facilities generated by uses and activities within the Summit Ridge Project Area, development sequencing of the Planned Community Program will provide for the logical extension of all required infrastructure and the provision of all reasonably related municipal services, including but not limited to, adequate fire protection and necessary ingress and egress. In the event a proposed application which meets all other City requirements for approval does not allow for the reasonably related extension of or provision for infrastructure and municipal services in a cost effective manner, including prescribed emergency access, the City may deny the application.

2.2.5 Density Transfers. Developer's transfer of density units from one Development Phase or more to others within the Summit Ridge Project Area shall be approved provided that (i) the proposed transfer does not exceed 25% of the density initially approved on the parcel to which additional units are transferred; (ii) the total density does not exceed the densities allowed for all parcels within the Planned Community Program; (iii) the proposed transfer does not assign any density to park or open spaces; (iv) the City ordinance or code compatibility standards between parcels are satisfied; (v) in the event the property from which density units are transferred is not owned by the owner of the property to which the density units are transferred, the owner of the property from which units are transferred must consent in writing to such transfer; (vi) in the event either parcel is jointly owned, the density transfer shall be determined on a pro-rata basis unless mutually agreed otherwise between the owners of the applicable parcels, and (vii) infrastructure is sufficient and available to meet the demands created by such transfer. Density transfers shall be initiated by notice to the City from the Developer which describes the Development Phase from which density is to be transferred, describes the Development Phase to which density is to be transferred and summarizes the impact of such transfer on infrastructure improvements. The density transfer shall be considered approved and complete when modification of a subdivision application submitted by Developer, including the extension or expansion of required infrastructure improvements, is approved by the City.

2.2.6 City Approval. Developer shall submit elevations of proposed construction for each Development Phase in the Summit Ridge Project Area to the City for its approval. Such approval shall not be unreasonably withheld or delayed.

2.2.7 Development Applications. Each residential development application submitted by Developer and/or its assignees who have purchased portions of the Summit Ridge Project Area shall, in addition to those items required by the Ordinance, or any other City ordinance or code, include a statement of (i) the total number of residential units allowed under the Planned Community Program; (ii) the cumulative total number of residential units previously approved for all of the properties within the Summit Ridge Project Area from the date of approval of the Planned Community Program to the date of the application; (iii) the number of units and densities for which a permit is sought under the particular Development Phase application; and (iv) the balance of residential units remaining allowable to the

Summit Ridge Project Area. Each commercial development application submitted by Developer and/or its assignees who have purchased portions of the Summit Ridge Project Area shall include, in addition to those items required by the Ordinance, or any other City ordinance or code, a statement of (i) the total number of square feet of Commercial Uses allowed under the Planned Community Program; (ii) the cumulative total number of square feet of Commercial Uses previously approved for all of the properties within the Summit Ridge Project Area from the date of approval of the Planned Community Program to the date of the application; (iii) the number of commercial square feet for which a permit is sought under the particular Development Phase application; and (iv) the balance of Commercial square footage remaining allowable to the Summit Ridge Project Area.

2.3 Consent of Owners. The Parties hereto recognize that the density configurations anticipated herein provide for greater density in certain portions of the Summit Ridge Project Area and less density in other portions, and that some areas shall be designated as open space with no density. By executing this Agreement, each of the Owners consents to the annexation of their respective properties according to the terms hereof and the restrictions this Agreement may impose on those properties. Developer and Owners acknowledge that such restrictions will preclude development other than as herein permitted and Owners agree that all property owned by them in the Summit Ridge Project Area is subject to and bound by the terms of this Agreement whether or not Summit Ridge hereafter acquires their property. Furthermore, Developer and Owners waive any claim they may now or hereafter have against the City for any taking, inverse condemnation, or other similar claim resulting from the restrictions or density and open space configurations imposed by this Agreement on the properties of the Owners which are subject to this Agreement. Nothing herein shall be construed to impose on any Owner an obligation or affirmative requirement to develop such Owner's property within the Summit Ridge Project Area.

SECTION III. GENERAL RIGHTS AND RESPONSIBILITIES

3.1 General Rights and Responsibilities of Developer

3.1.1 Conditions of Approval and Impact Fees. With respect to the development of the Summit Ridge Project Area, Developer accepts and agrees to comply with the plan examination, impact, connection, building and other fees of the City currently in effect, or as amended, and the City agrees and represents that any such fee schedule will be applied uniformly within the City or service area of the City, as applicable. Developer acknowledges that the Project requires infrastructure supported by impact and connection fees and finds the fees currently imposed to be a reasonable monetary expression of exactions that would otherwise be required at this time. Developer agrees not to challenge, contest or bring a judicial action seeking to avoid payment of or to seek reimbursement for such fees, so long as such fees are applied uniformly within the City or service area and Developer receives all credits and offsets against such fees as provided in this Agreement. The Developer shall be given impact fee credits for facilities for which Developer pays, if any, which ordinarily would be constructed with impact fee monies and Developer shall be reimbursed for such fees as set forth in Section 3.2 below.

3.1.2 Reliance. The City acknowledges that the Developer is relying on the execution and continuing validity of this Agreement and the City's faithful performance of the City's obligations under this Agreement in Developer's existing and continued expenditure of substantial funds in development of the Summit Ridge Project Area, in Developer's continued commitment and obligation to provide financing for such development and in incurring other expenses in connection with development of the Project. The Developer acknowledges that the City is relying on the execution and continuing validity of this Agreement and the Developer's faithful performance of its obligations under this Agreement in continuing to perform the obligations of the City hereunder.

3.1.3 Rights Granted by Approval of the Planned Community Program. To the fullest extent permissible under the law, it is the intent of the City, the Owners and the Developer that the execution of this Agreement grants and vests in the Developer all rights, consistent with the Planned Community Program, the Ordinance and all other plans and ordinances generally applicable throughout the City, to develop the Summit Ridge Project Area in fulfillment of the Planned Community Program without modification or interference by the City except as specifically provided herein and under City ordinances. The Parties intend that the rights granted to the Developer under this Agreement are both contractual and as provided under the common law concept of vested rights.

3.1.4 Statement Regarding "Compelling, Countervailing Public Interests". The City, Developer, and Owners acknowledge that they are familiar with the "compelling, countervailing public interest" test that is generally an exception to the doctrine of vested rights in the State of Utah.

3.1.4.1 The City acknowledges that as of the date of this Agreement, to the best of its knowledge, information and belief, the City is presently unaware of any material facts under which a desire of the City to modify the Developer's or Owner's rights under this Agreement or the Planned Community Program would be justified by a "compelling, countervailing public interest."

3.1.4.2 If, however, it should be discovered that there did, in fact, exist, as of the date of this Agreement or there shall later come into being, material facts under which modification of the Developer's or Owners' rights under this Agreement or the Planned Community Program would be justified by a "compelling, countervailing public interest," Developer and Owners acknowledge that they neither have nor had any vested rights as to any matter arising from or affected by any such material facts of which the City was not or could not have been aware as of the date of this Agreement.

3.1.5 Construction Mitigation. Developer or its successors shall provide the following measures, all to the reasonable satisfaction of the City's Engineer, to mitigate the impact of construction within Summit Ridge Project Area. Developer and its successors shall also adhere to the usual construction impact mitigation measures required by the City. Additional reasonable site-specific mitigation measures may be required. The following measures shall be included in each application for development of any Development Phase:

3.1.5.1 Limits of disturbance, vegetation protection and the re-vegetation plan for all construction, including construction of public improvements (an MPDES permit being required on any construction involving a parcel in excess of 5 acres in size).

3.1.5.2 Construction staging, on-site batch plants, and materials stockpiling and recycling to keep all excavated materials on site during the Project infrastructure and construction phases.

3.1.5.3 Construction traffic routing plan to minimize traffic impacts on Santaquin City and residential areas, by only allowing construction traffic to use current state roads, unless otherwise directed by the City.

3.1.5.4 Mitigation of dust throughout construction, pursuant to Rule R-307-205 of the Utah Administrative Code, relevant Santaquin City Ordinances, and all other applicable statutes, regulations and ordinances.

3.1.5.5 Protection of existing infrastructure improvements from abuse or damage while new infrastructure improvements are being constructed.

3.1.6 Subsequent Applications Under Future Development Code. Without waiving any rights granted by this Agreement, Developer may from time-to-time or at any time, choose to submit some or all of Developer's properties for development under the version of the City's code and ordinances existing at the time of the application.

3.1.7 Demonstration of Ability. Developer, or any Continuing Owner, as applicable, shall demonstrate that Developer (or such Continuing Owner) possesses or is reasonably certain to receive the financial resources (money, equity, loans, and the like) necessary to undertake and complete the Project's development or its portion thereof. If and at any time Developer or such Continuing Owner fails or is unable to perform pursuant to the provisions of Section 6.12 hereof, the City may request, and Developer or a Continuing Owner shall provide, evidence that it still possesses or is reasonably certain to receive the financial resources necessary to continue the contemplated development within the Summit Ridge Project Area.

3.1.8 Dedication of Infrastructure Improvements. Unless otherwise specifically provided herein, the Developer shall dedicate all infrastructure improvements in the Summit Ridge Project Area to the City at such time as those improvements are accepted by the City, reserving or transferring to Summit Ridge prior to such dedication, all capacity in excess of the capacity beyond that necessary for development of the portion of the Summit Ridge Project Area held by Summit Ridge; provided that this Section shall not apply to any upsizing required and paid for by the City.

3.2 General Rights and Responsibilities of the City

3.2.1 Reserved Legislative Powers. This Agreement shall not limit the future exercise of the police powers of the City to enact ordinances, standards, or rules regulating development. The City acknowledges, however, that any exercise of its legislative or police powers which alters or modifies this Agreement to Developer's detriment may render the City liable to such remedies as may be available to Developer under such circumstances.

3.2.2 Infrastructure Fees and Reimbursements. All applicants for development of property within the City or Utah County which anticipate connection to the water, sewer, water storage, storm drainage or waste water reuse facilities installed by Developer within the Summit Ridge Project Area (each, an "Applicant") shall pay a fee directly to Summit Ridge for a pro rata share of the costs of the improvement or obtain written consent for connection to such improvement from Summit Ridge. Such charge to the Applicant shall be based on the Applicant's estimated usage of the subject improvements, calculated in Equivalent Residential Units ("ERUs") compared with the total capacity of the improvements. It shall be a condition to the City's issuance of a building permit or approval of a subdivision application that such fee be paid or that such consent from Summit Ridge be obtained, unless the fee is otherwise paid to Summit Ridge by the City as a reimbursement. Summit Ridge agrees to distribute all fees paid to Summit Ridge pursuant to this requirement pro rata to the Owners who have paid a portion of the relevant infrastructure cost, if any. The City shall include in its standard development applications and line extension agreements for Applicants the requirement that the pro rata portion of infrastructure costs has been paid or that the consent of Summit Ridge is obtained. Each such application or agreement shall require the written consent of Summit Ridge as an owner of a portion of the improvements. Notwithstanding the foregoing, no fees shall be due from Applicants who have paid for their pro rata portion of the relevant improvement through creation of a special improvement district.

3.2.3 Continuing Owners' Agreement to Reimburse. Each Continuing Owner hereby agrees that it shall reimburse Summit Ridge for the pro rata portion of the costs of any

infrastructure improvement to which it intends to connect or from which it will receive a benefit and that this reimbursement obligation shall run with the land and be the continuing obligation of any successor to such Continuing Owner. Reimbursement shall be made after the City has approved the application to the City for development but prior to issuance of the permit or approval of the subdivision plat.

3.2.4 Impact Fee Credits. In the event Developer constructs, prior to the date such fee would be due, the improvements for which an impact fee is normally collected, the cost of such improvement shall be credited against the impact fee otherwise charged. Developer shall also be given a credit for impact fees for land dedicated to and accepted by the City in lieu of such improvements. In each instance, Developer shall submit to the City invoices demonstrating the reasonable and verified costs incurred for such improvements or appraisals indicating the fair market value of dedicated land. The amount of the credit shall be equal to the lesser of (i) the impact fee otherwise required, and (ii) the reasonable and verified costs of the improvements paid by Developer or, in case of dedicated land, the fair market value of such land. Only the party expending funds for such infrastructure improvements shall be entitled to the impact fee credit.

3.2.5 Reimbursement Agreement. The City agrees to enter into a Reimbursement Agreement with Summit Ridge in the form attached hereto as Exhibit F, providing that the City shall make it a condition of approval for all development applications which propose to connect to infrastructure installed by Developer that Summit Ridge be paid the pro rata cost of the installation of the infrastructure improvements as more specifically set forth herein.

3.2.6 Oversized Infrastructure. Whenever Developer installs water, sewer, water storage, storm drainage, or waste water reuse facilities whose capacity, as required by the City, exceeds that needed by Developer, the City shall pay the cost of materials and labor for such excess capacity as set forth in the Reimbursement Agreement.

3.2.7 Compliance with City Requirements and Standards. Developer and Owners expressly acknowledge that nothing in this Agreement shall be deemed to relieve Developer or any Continuing Owner from its obligations to comply with all applicable requirements of the City necessary for approval and recordation of subdivision plats and site plans for the Summit Ridge Project Area in effect at the time of development approval, including the payment of unpaid fees, the approval of subdivision plats and site plans, the approval of building permits and construction permits, and compliance with all applicable ordinances, resolutions, policies and procedures of the City.

3.2.8 Power of Eminent Domain. The City agrees that in the event the Developer needs to obtain easements or rights of way for the purpose of constructing infrastructure improvements for the Project and is otherwise unable to negotiate a reasonably acceptable contract for such easements or rights of way, the City, upon the request of Developer, may consider exercise of its power of eminent domain to obtain such easements or rights of way, the cost of which shall be borne by such Developer. The City shall be reimbursed by such Developer for all expenses incurred in taking the requested action.

3.2.9 Development Area a Part of Santaquin City. Upon annexation, the Summit Ridge Project Area shall become and remain, for all purposes—including government, taxation, municipal services and protection, and consideration in all municipal matters—a part of Santaquin City. Development therein, and the residents and occupants thereof, shall be treated in all respects as is any other development, resident, or occupant of Santaquin City.

3.2.10 Cooperation of City. The City may cooperate with Developer in connection with financing of the Project including without limitation consideration of the issuance of bonds or creation of a special improvement district.

3.3 **Recording.** Developer and the City shall cause a memorandum of this Agreement, approved by the City, to be recorded with the county recorders of both Utah and Juab Counties. Contemporaneously with the execution of this Agreement, Developer and Owners shall also execute and cause to be recorded with the county recorders of Utah and Juab Counties, the Covenants, Conditions and Restrictions in substantially the form attached hereto as Exhibit D and the Summit Ridge Development Plan which designates all open space associated with the Summit Ridge Project Area.

SECTION IV. SPECIFIC RIGHTS AND RESPONSIBILITIES

4.1 Water

4.1.1 Developer's Obligations.

4.1.1.1 **Water System.** Developer shall (i) design, build and dedicate to the City an adequate culinary water facility according to City specifications and standards, including all distribution lines, for the Summit Ridge Project Area and (ii) design and build, according to City specifications and standards, a water storage and delivery system to serve the Summit Ridge Project Area, including all fire flow and irrigation needs. All facilities required to provide the culinary and secondary water system shall be constructed and installed according to City specifications and standards in each subdivision or site plan area concurrent with the construction of other improvements in such subdivision or site plan area. All facilities necessary to provide both a culinary and a secondary water system for irrigation purposes installed by Summit Ridge within the Summit Ridge Project Area, upon acceptance by the City, shall be owned, operated and maintained by the City.

4.1.1.2 **Water Source.** Developer shall, subject to City review and approval, design and construct, according to City specifications and standards and well head protection requirements, a water source and delivery system to transport water from the water source to the Summit Ridge Project Area and to dedicate that system to the City. Developer and the City anticipate that such delivery system will include the development of a well or wells of sufficient capacity to serve the Summit Ridge Project Area.

4.1.1.3 **Water Storage.** As part of the preparation of a water storage and delivery system or secondary water system, under the provisions of §4.1.1.1(ii), Developer and Owners shall grant to the City such easements, rights of way, rights of entry, or other servitudes as may be necessary for the City to introduce into, store in, and remove water from such ponds, streams, and lakes as may exist or be constructed by Developer or others within the Summit Ridge Project Area.

4.1.1.4 **Water Rights.** The Developer shall obtain and dedicate to the City water rights acceptable to the City and sufficient to serve the Project. In the event that the water rights dedicated are not approved by the State Engineer of Utah, or are not approved in sufficient quantity to meet the requirements of the City for the Summit Ridge Project Area (and After-Acquired Properties as applicable), Developer, with the cooperation of City, shall acquire and dedicate at Developer's expense to the City additional water rights as necessary until the requirements of the State Engineer of Utah, Division of Drinking Water and the Santaquin Fire Marshall have been met. Said rights may be evidenced by deed or by the transfer of water shares, so long as the transfer of water shares is approved by the Board of Directors of the company holding such water rights. The Developer shall bear all costs and expenses associated with the transfer or approval of such water rights for use in the City by the City, and shall reimburse the City for any costs it may incur in connection therewith.

4.1.2 City Obligations. Upon the dedication and acceptance by the City of the water delivery system, the required water rights, the necessary approvals and acceptance of water rights provided in paragraph 4.1.1 above, and payment of (or credit against) impact fees by Developer, the City shall provide all use areas served by such infrastructure within the Summit Ridge Project Area with culinary water service at a level generally provided to other areas of the City. The Developer shall design water storage facilities and lines within the Summit Ridge Project Area, to be reviewed by the City. The Developer shall bear the costs incurred for such design and construction of the water delivery system.

4.2 Sanitary Sewer Service and Facilities

4.2.1 Developer's Obligations. In recognition and consideration for the City's willingness to provide the sanitary sewer service necessary to meet the demands of the Planned Community Program, Developer and Owners voluntarily agrees as follows:

4.2.1.1 Easements and Installation. Developer and Owners shall grant to the City, at no cost to the City, all easements within the Summit Ridge Project Area determined necessary by the City, for the construction and operation of the wastewater treatment plant, including easements necessary for the installation and maintenance of all wastewater collection lines, located within the Summit Ridge Project Area. Developer shall also install all sewer lines and other infrastructure improvements, including, but not limited to lift stations, necessary to provide such service. Developer and the City shall together determine responsibility for construction of the wastewater facility.

4.2.1.2 Payment of Sewer Impact Fees. All preliminary and final subdivision plats and all site plan approvals presented after the effective date of this Agreement are subject to the payment of sewer impact fees and sewer connection fees then in effect and generally applicable to other development within the City, payable at the time of building permit issuance, provided that the Developer shall be given credit against such impact fees as provided for in Sections 3.1.1, 3.2.2, 3.2.3 and 3.2.4.

4.2.1.3 Purchase of Wastewater Treatment Plant Effluent. In the event the wastewater treatment facility is constructed by Developer, the City shall sell all treated wastewater generated by that plant and required by Developer to Developer, and may then sell all excess treated wastewater directly to the user at a rate reasonably set by the City. In the event the wastewater treatment facility is constructed by the City, the City may sell treated wastewater directly to any user, including the Developer, at a rate reasonably determined by the City. Such water shall be used for irrigation or secondary purposes permitted by the Utah Division of Water Quality. Upon receipt of revenue from the sale of such treated wastewater, the City intends to reevaluate its rates for sanitary sewer service to consider a reduction resulting from the reuse fees.

4.2.2 City Obligations. Upon construction to City specifications and standards of all required sewer-related infrastructure improvements, the payment of or credit against all required impact fees and dedication and acceptance of all lines and necessary sewer-related improvements and easements, the City shall provide to all residential and nonresidential use areas, identified on the Planned Community Program, sanitary sewer service at a level generally provided to other areas of the City.

4.3 Transportation, Traffic Mitigation and Landscaping

4.3.1 Developer Obligations. Developer has agreed to provide the following transportation and traffic mitigation measures:

4.3.1.1 Road and Intersection Improvements. Periodic amendments to the Public Amenities Plan will show the road system improvements which shall be constructed by Developer at no cost to the City in satisfaction of this obligation. Such improvements shall be constructed according to City specifications and standards in phases according to a schedule determined by the Developer and approved by the City, consistent with the actual construction schedule for the Development. Prior to the construction of any of the improvements described below, the City shall review and approve or reject with suggested changes all plans, drawings and specifications with respect to the alignment and construction of such road and intersection improvements. Following Developer's completion of the construction of such improvements, Developer shall dedicate such improvements to the City. Notwithstanding the foregoing, in the event Developer desires to utilize private roads in any portion of the Summit Ridge Project Area, Developer may seek approval from the City (which approval shall not be unreasonably withheld) to do so as agreed between the City and Developer, provided that such private roads are constructed in accordance with City specifications and standards. In that event, the private road will not be dedicated to the City, and Developer shall pay all costs of installation and maintenance of such improvements.

4.3.1.2 Reimbursement Agreements. Developer, in partnership with successors, assignees, adjoining landowners or acting alone, shall construct all required arterial, parkway and collector streets as identified in Exhibit E. Upon request by Developer, the City may consider establishing a procedure for the equitable distribution of utility and infrastructure development costs, and/or Developer shall have the opportunity to apply to the City for the equitable sharing of all costs associated with the acquisition and construction of such arterial, parkway and collector streets.

4.3.1.3 Landscaping. Upon Planning Commission approval, Developer shall construct and create, at Developer's sole cost and expense, landscape improvements as set forth in the Design Guidelines.

4.3.2 City Obligations.

4.3.2.1 Street Rights-of-Way. The City shall cooperate with Developer, as necessary, to obtain all necessary rights-of-way located off the Summit Ridge Project Area, including if necessary, and as mutually agreed by the City and Developer, the exercise of eminent domain by the City to insure the desired location of arterial, parkway and collector streets necessary for the Project. Developer shall pay all costs incurred by the City at Developer's request including attorney and expert fees in acquiring rights of way for its property, whether or not by eminent domain. Developer and Owners shall grant, at no cost to the City or each other, rights of ways as set forth on the Summit Ridge Development Plan.

4.3.2.2 Street Design. The City accepts the street design, as contained and provided in the Design Guidelines, as the specifications and standards for street design for all parkway, arterial and collector streets for the Project.

4.3.2.3 Dedication. The City shall accept the dedication of all arterial, parkway and collector streets in the Summit Ridge Project Area, so long as such streets are constructed to City specifications and standards and are dedicated free and clear of liens and encumbrances.

4.4 Police and Fire Protection

4.4.1 Developer's Obligations. In recognition and consideration of the fact that the City shall provide police and fire protection services to the Summit Ridge Project Area, Developer voluntarily agrees to deed, at no cost to the City, a site or sites of up to three (3) acres, located in the

Summit Ridge Project Area, for the construction of police, fire, and/or other municipal facilities. The exact location of the site or sites shall be determined by the Developer and the City together, consistent with the Summit Ridge Development Plan.

4.4.2 City Obligation. The City shall provide to all residential and nonresidential use areas in the Summit Ridge Project Area, police and fire protection services. This obligation shall not be enforceable by or against any third party claiming to be a beneficiary.

4.5 Park and Open Space Areas

4.5.1 Developer's Obligations. In recognition and consideration that the City shall be required to provide and improve park and recreational amenities, as practical, within the Summit Ridge Project Area, Developer and Owners voluntarily agree as follows:

4.5.1.1 Park Sites and Open Area. Summit Ridge shall provide and dedicate, free and clear of liens and encumbrances, by special warranty deed, to the City within eighteen months of the date of this Agreement, at a no cost to the City, fee title to twelve (12) acres of land within the Summit Ridge Project Area for a park site. Summit Ridge shall be entitled to reimbursement or impact fee credit pursuant to Sections 3.2.2, 3.2.3 and 3.2.4 above with respect to any improvements made to the twelve (12) acre park property but not with respect to donation of such park land. Additional open space and parks, including regional and neighborhood parks, shall thereafter be conveyed at locations and sizes as determined appropriate by the Developer and the City at such times as necessary to comply with the prescribed standard of five (5) acres per 1000 residents. Developer (or any Owner directly deeding such land to the City) shall receive an impact fee credit for any park improvements or park land dedicated to and accepted by the City by Developer as a donation beyond the initial twelve (12) acre donation. City acknowledges that, under the terms of this Agreement, the land being dedicated to the City in the Summit Ridge Project Area by Developer for parks and open spaces substantially exceeds the minimum requirements of the City for open area and green space.

4.5.1.2 Golf Course. To add an open space amenity to the Summit Ridge Project Area, Developer, together with the applicable Continuing Owner, shall set aside open space for one or more golf courses in the Summit Ridge Project Area at the location(s) as generally identified on Exhibit B. While such land will be credited as open space within the Project, such land shall not be dedicated or deeded to the City, instead being owned by Developer or its successors. Construction of an eighteen hole golf course shall be initiated within eighteen months of the date of this Agreement and at least nine holes shall be completed and open for play within three years of the start of construction. After such completion, at least one golf course shall be available for play by the general public. A discount will be provided to Santaquin City residents.

4.5.2 City Obligations.

4.5.2.1 Park Facilities. Upon dedication and acceptance by the City of the improved parks and trail areas herein contemplated, the City shall provide to all residential and nonresidential use areas within the Summit Ridge Project Area, trails, and park and recreational services at a level generally provided to other areas of the City, subject to Developer's obligations as set forth herein. The City may, under the Utah Special Service District Act, create one or more recreation districts in the Summit Ridge Project Area and in other areas of the City to provide funding for recreational amenities. Developer and Owners consent to creation of such districts and this consent shall be binding upon their successors and assigns.

4.5.2.2 Use of Park and Recreation Impact Fees. As permitted by applicable state law and City ordinance, and as practical, the City shall use park and recreation impact fees, imposed on all subdivision plats and site plan approvals for areas within the Summit Ridge Project Area, to improve park areas located within the Summit Ridge Project Area. Those fees are to be collected at the time of issuance of a building permit within the Summit Ridge Project Area. The City acknowledges that Developer shall not be required to pay impact fees otherwise imposed on a developer in the event Developer constructs the improvement for which the impact fee is normally imposed.

4.6 Public Facilities and Amenities

4.6.1 Developer's Obligations. In recognition and consideration that the City will be required to provide public facilities and services to the Summit Ridge Project Area, Developer voluntarily agrees as follows:

4.6.1.1 Public Facility Sites. Summit Ridge shall donate to the City a three (3) acre site, as set forth in Section 4.4.1, as designated on the Summit Ridge Development Plan for the provision of public facilities as determined necessary by the City.

4.6.1.2 School Sites. Summit Ridge shall set aside for purchase by the Nebo School District, at a price to be negotiated, a ten (10) acre site for an elementary school.

4.6.1.3 Churches. Summit Ridge and the Continuing Owners shall set aside for purchase by churches, at prices to be negotiated, a pro rata portion of property for a minimum of eight church sites.

4.6.2 City Obligations. The City shall provide to all residential and nonresidential use areas within the Summit Ridge Project Area, public facilities and services at a level generally provided to other areas of the City, subject to Developer's and Continuing Owners' fulfillment of their obligations as set forth herein.

4.7 Utilities.

4.7.1 Developer's Obligations. Developer shall be responsible for the provision of utility infrastructure within the Summit Ridge Project Area, including (but not necessarily limited to) the following:

4.7.1.1 As provided in Sections 4.1 and 4.2, the culinary and secondary water systems including wells and all appurtenances;

4.7.1.2 As provided in Section 4.2, the sewer and sanitary systems;

4.7.1.3 Runoff and storm drainage consistent with the City storm water master plan to be prepared;

4.7.1.4 Design engineering for natural gas to be provided by the City;

4.7.1.5 Installation for electrical, telephone and cable television (if any) services to be provided by the various service providers; and

4.7.1.6 Conduit and pull boxes to accommodate the future fibre optic telecommunications network within the Project.

4.7.1.7 Developer and Owners shall, provide and or dedicate, to the City, the Developer or other Owners, as applicable, all easements, rights of way, rights of entry, or other servitudes as may be necessary for the installation and maintenance of the infrastructure contemplated herein.

Developer acknowledges that all utility lines, conduits, pipes, maintenance or service stations and pump houses shall be installed underground, to the extent that such installation (a) is reasonably practicable, (b) lies within the parameters of City specifications, (c) complies with applicable federal, state and local law, regulation, and ordinance, and (d) accords with industry standards and practice.

4.7.2 **City's Obligations.** Subject to the location of existing or planned improvements, the City agrees to dedicate easements and infrastructure on property owned by the City as may be necessary to connect, link, construct or accommodate such utility improvements in the Summit Ridge Project Area; provided that the City shall have the authority to determine the route for such improvement.

4.8 **Public Trails.** Developer shall construct and dedicate public trails designated on the Planned Community Plan within the Summit Ridge Project Area to the extent such trails are located on its property. Such trails shall be constructed to the standards reasonably set forth in the City's ordinances and regulations.

SECTION V. GENERAL PROVISIONS

5.1 **Covenants Running with the Land.** The provisions of this Agreement shall constitute real covenants, contract and property rights and equitable servitudes, which shall run with all of the land subject to this Agreement. The burdens and benefits hereof shall bind and inure to the benefit of each of the Parties hereto and all successors in interest to the Parties hereto. All successors in interest shall succeed only to those benefits and burdens of this Agreement which pertain to the portion of the Summit Ridge Project Area to which the successor holds title. Such titleholder is not a third party beneficiary of the remainder of this Agreement or to zoning classifications and benefits relating to other portions of the Summit Ridge Project Area. The obligations of Summit Ridge hereunder are enforceable by the City, and no Continuing Owner shall or may be a third party beneficiary of such obligations unless specifically provided herein.

5.2 **Change in Developer.** Developer acknowledges that its qualifications and identity are of particular concern to the City, and that it is because of such qualifications and identity that the City is entering into this Agreement. Accordingly, Developer agrees for itself and any successor in interest of itself that, prior to the contemplated completion of the terms of this Agreement, Developer shall not convey, assign, or dispose of the Project to another developer, except as provided herein, unless the proposed replacement developer has financing and skill reasonably satisfactory to the City to take over the contemplated development of the Summit Ridge Project. Any replacement developer shall provide the City with documentation of its expertise and financial capability upon request. In the event of an assignment, the transferee shall succeed to all of Developer's rights under this Agreement. Notwithstanding the foregoing, Developer's selling or conveying individual lots or parcels of land to builders, individuals or other developers for subdivision or commercial development shall not be deemed to be an "assignment" subject to the above requirement for approval unless specifically designated as an assignment by Summit Ridge.

5.3 No Agency, Joint Venture or Partnership. It is specifically understood and agreed to by and among the Parties that: (i) the subject development is a private development; (ii) the City, Developer and Owners hereby renounce the existence of any form of agency relationship, joint venture or partnership among the City, Developer and/or any Owner; and (iii) nothing contained herein shall be construed as creating any such relationship among the City, Developer and/or any Owner.

5.4 Consent. In the event this Agreement provides for consent from the City or the Developer or Owner, such consent shall be deemed to be given thirty (30) days after consent is requested in writing in the event no response to the request is received within that period. All requests for consent shall be made in writing, and in no event shall consent be unreasonably withheld or delayed.

5.5 Process for Modifying Planned Community Program.

5.5.1 Intent. The City acknowledges that the Planned Community Program is a general outline of the proposed development of the Summit Ridge Project Area with specific land uses permitted as set forth on the Summit Ridge Development Plan. Summit Ridge is entitled to, and the City hereby grants to Summit Ridge, the right to make minor changes or adjustments in the exact location of various development uses and densities under the provisions of this Agreement between or among the parcels in the Summit Ridge Project Area to reflect future changes in economic factors, development, ownership or other relevant matters so long as such changes are (i) approved by the Owner (if other than Summit Ridge); (ii) do not require the uncompensated relocation of public improvements which have been constructed; (iii) do not materially and adversely impact other public improvements depicted and planned on the Summit Ridge Development Plan; (iv) do not adversely impact the provision of city services and emergency access; and (v) do not alter any approved subdivision.

5.5.2 Application. In the event Summit Ridge desires to make a major modification in the Summit Ridge Development Plan as permitted by this Section 5.5, Summit Ridge shall submit to the City a modification application together with an application fee of an amount then uniformly charged by the City for review by its Development Review Committee, Planning Commission and City Council. For purposes of this Section, a major modification shall be a change not normally reviewed by the City as part of the application process. Because of the size, complexity and potential scale and detail of any changes to the Summit Ridge Development Plan, the City shall have sixty (60) calendar days after submittal of the application for modification to inform the Summit Ridge of whether the City considers the application to be complete. If the City does not notify Summit Ridge in writing within sixty (60) days of such application that additional information is required to complete the application, it shall thereafter be deemed complete. If the City determines the application is not complete as submitted, it shall specify within the sixty (60) day period, which portions are not complete and what additional information is required. The City shall notify Summit Ridge within thirty (30) days of the submission of such additional information whether the City considers the application to then be complete, or shall within that period specify to developer which portions are not yet complete and what additional information is still required. If no such notice is given within the thirty (30) day period, the application for modification shall then be deemed complete.

5.5.3 Review by City. The City shall have ninety (90) calendar days after the application for modification is accepted or deemed complete to review the proposed changes. If the City does not object within ninety (90) days, the final completed application for modification shall be deemed accepted by the City and shall constitute an amendment to the Planned Community Program and Summit Ridge Development Plan, and an express waiver by the City of the enforcement of the City's General Plan and any regulations or ordinances which are in conflict with the amendment. In the event the City objects to the application for modification, the City shall specify in writing in reasonable detail the reasons the City

believes that the application is not consistent with the City's General Plan or other policies, plans and ordinances of general applicability allowed by this Agreement.

5.5.4 Resolution of Objections. The City and Summit Ridge shall meet within fourteen (14) calendar days of any objection to resolve the issues presented by the application for modification.

5.5.4.1 In the event the City and Summit Ridge are unable to resolve any issue arising with respect to this Section 5.5, either may give notice of request for mediation and the issue shall be submitted to mediation within ten (10) days. The mediation shall be conducted by a mutually acceptable mediator, to be scheduled as soon as possible. In the event the Parties cannot agree on a mutually acceptable mediator, each shall appoint a land use planning expert within seven (7) days of the submission to mediation, and those experts shall mutually select the mediator.

5.5.4.2 In the event the mediation is unsuccessful, the Parties may pursue any other remedy allowed by law. In the event the Parties agree to arbitrate, they shall agree on a single arbitrator to resolve the terms of the application for modification. If the Parties are unable to agree on single acceptable arbitrator within seven (7) days of executing an agreement to arbitrate, the land use planning experts appointed to select the mediator shall then together choose the single arbitrator. This Section 5.5.4.2 shall not be construed as an agreement to arbitrate, nor may arbitration take place except pursuant to a separate arbitration agreement executed by the Parties hereto. The entire scope of any arbitration, and the power of the arbitrator thereto, shall derive wholly and solely from the separate arbitration agreement contemplated herein, and this requirement cannot be waived, except by the mutual, written consent of all of the Parties hereto.

5.6 Legal Challenges. In the event of a challenge to this Agreement or the development contemplated herein and upon request by Developer, or with notice to Developer and Developer's acceptance or acquiescence, the City may undertake to defend Developer from liability to the extent permitted by law. In such a case, Developer agrees that it shall reimburse all legal fees, including attorneys' fees, expenses, and/or court costs incurred by the City upon presentation to the Developer of an itemized list of costs, expenses, and fees; provided that in the event Developer does not agree to accept the City's defense or reimburse the City's legal fees, the City shall have no duty to defend the challenge of this Agreement by any third party.

SECTION VI. MISCELLANEOUS

6.1 Incorporation of Recitals, Introductory Paragraphs, and Exhibits. The Recitals contained in this Agreement, the introductory paragraph preceding the Recitals, and all Exhibits referred to or attached hereto are hereby incorporated into this Agreement as if fully set forth herein.

6.2 Other Miscellaneous Terms. The singular shall include the plural; the masculine gender shall include the feminine; "shall" is mandatory; "may" is permissive.

6.3 Severability. If any provision of this Agreement or the application of any provision of this Agreement to a particular situation is held by a court of competent jurisdiction to be invalid or unenforceable, the remaining provisions of this Agreement shall continue in full force and effect.

6.4 **Construction.** This Agreement has been reviewed and revised by legal counsel for Developer, Owners and the City, and no presumption or rule that ambiguities shall be construed against the drafting Party shall apply to the interpretation or enforcement of this Agreement.

6.5 **Further Assurances, Documents and Acts.** Each Party hereto agrees to cooperate in good faith with the others, and to execute and deliver such further documents and to take all further acts reasonably necessary in order to carry out the intent and purposes of this Agreement and the actions contemplated hereby. All provisions and requirements of this Agreement shall be carried out by each Party as allowed by law.

6.6 **Assignment.** Neither this Agreement nor any of the provisions, terms or conditions hereof can be assigned by the Developer or the Owners to any other party, individual or entity without assigning the rights as well as the obligations under this Agreement and complying with the other provisions herein concerning assignments. The rights of the City under this Agreement shall not be assigned, but the City is authorized to enter into a contract with a third party to perform obligations of the City to operate and maintain any infrastructure improvement so long as such party adequately and reasonably maintains and operates such facility or improvement.

6.7 **Agreement to Run with the Land.** A Memorandum of this Agreement shall be recorded against the Summit Ridge Project Area and shall be deemed to run with the land.

6.8 **Governing Law and Dispute Resolution.** This Agreement shall be governed by and construed in accordance with the laws of the State of Utah. Any and all disputes arising out of or related to this Agreement or the Parties' performance hereunder shall be submitted to mediation before a mutually-acceptable mediator prior to initiation of litigation or any other binding or adjudicative dispute resolution process. The Parties shall: (i) mediate in good faith; (ii) exchange all documents which each believes to be relevant and material to the issue(s) in dispute; (iii) exchange written position papers stating their position on the dispute(s) and outlining the subject matter and substance of the anticipated testimony of persons having personal knowledge of the facts underlying the dispute(s), and; (iv) engage and cooperate in such further discovery as the Parties agree or mediator suggests may be necessary to facilitate effective mediation. Mediator, venue, and related costs shall be shared equally by the Parties to the dispute. Venue of the mediation shall be the State of Utah. In the event the Parties are unable to agree upon a mediator, the mediator shall be appointed as set forth in Section 5.5.4.1 above. This provision shall be specifically enforceable according to its terms, including but not limited to an action to compel mediation. The prevailing party in any action to enforce in whole or in part this mediation clause or in any subsequent arbitration or mediation shall be entitled to reimbursement of attorneys fees and costs incurred in said action. In the event any dispute arising hereunder is not resolved through mediation, the parties to that dispute may pursue any other remedy allowed by law. Any agreement by the Parties to arbitrate shall be governed by Section 5.5.4.2 above.

6.9 **Notices.** Any notice or communication required hereunder between the Parties must be in writing, and may be given either personally or by registered or certified mail, return receipt requested or by facsimile. If given by registered or certified mail, the same shall be deemed to have been given and received on the first to occur of (i) actual receipt by any of the addressees designated below as the Party to whom notices are to be sent, or (ii) five (5) days after a registered or certified letter containing such notice, properly addressed, with postage prepaid, is deposited in the United States mail. If personally delivered, a notice is given when delivered to the Party to whom it is addressed. If given by facsimile to the address and number for such Party set forth below (provided, however, that the notice is not effective unless a duplicate copy of the facsimile notice is promptly given by one of the other methods permitted under this paragraph), the notice is deemed to have been given upon receipt by the other Party. Any Party hereto may

at any time, by giving ten (10) days written notice to other Parties hereto, designate any other address in substitution of the address to which such notice or communication shall be given. Such notices or communications shall be given to the Parties at the address set forth below:

If to City to:

Susan Farnsworth
Santaquin City Recorder
45 West 100 South
Santaquin, Utah 84655
Facsimile: (801) 754-3526

With a copy to:

Nielsen & Senior
60 East South Temple, Suite 1100
Salt Lake City, Utah 84111
Facsimile: (801) 532-1913
Attention: J. Craig Smith

If to Developer to:

Summit Ridge Development, LLC
622 North 1280 East
Orem, Utah 84097-5442
Facsimile: (801) 434-4968
Attention: R. Kent Kunz

With a copy to:

Fabian & Clendenin
215 South State Street, Suite 1200
Salt Lake City, Utah 84111
Facsimile: (801) 596-2814
Attention: Diane H. Banks

If to Owners to:

South County Development
Cottonree Square
2230 North @ University Parkway
Building 7G
Provo, Utah 84604
Facsimile: (801) 375-0502
Attention: H.M. Magelby

With a Copy to:

Fillmore Belliston & Israelsen
4692 North 300 West, Suite 200
Provo, Utah 84604
Facsimile: (801) 426-8208
Attention: John K.M. Olsen

Shirl L. Ekins
Trustee of the Shirl Ekins Family Trust
90 East Highway 6
Genola, Utah 84655

Holman Walker & Hutchings
9537 South 700 East
Sandy, Utah 84070
Facsimile: (801) 990-4999
Attention: Michael Hutchings

Lori Ann Ekins Dunn
Trustee of the Shirl L. Ekins Family
Irrevocable Trust
31 West Cimmarron Way
Erda, Utah 84074
Facsimile: (435) 843-1780

Holman Walker & Hutchings
9537 South 700 East
Sandy, Utah 84070
Facsimile: (801) 990-4999
Attention: Michael Hutchings

Utah S.H.O.P., LLC
638 Scenic Drive
Spanish Form, Utah 84660
Facsimile:
Attention: Don Larsen

Daryl J. and Darlene Kay
Trustees of the Daryl J. Kay Family Trust
188 South 200 West
Payson, Utah 84651-2140

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Willis H. and Coy Morgan
P.O. Box 108
Goshen, Utah 84633

School and Institutional Trust Lands
Administration
675 East 500 South, Suite 390
Salt Lake City, Utah 84102-2818

Jones, Waldo, Holbrook & McDonough
170 South Main, Suite 1500
Salt Lake City, Utah 84101
Facsimile: (801) 328-0537
Attention: Rick Knuth

6.10 **No Third Party Beneficiary.** This Agreement is made and entered into for the sole protection and benefit of the Parties and their assigns, subject to the provisions of Section 5.1 above. No other Party shall have any right of action based upon any provision of this Agreement whether as third party beneficiary or otherwise.

6.11 **Counterparts and Exhibits.** This Agreement may be executed in duplicate counterparts, each of which is deemed to be an original. This Agreement consists of twenty four (24) pages, and an additional six (6) exhibits, which together constitute the entire understanding and agreement of the Parties to this Agreement. The following exhibits are attached to this Agreement and incorporated herein for all purposes:

Exhibit A	Legal description of Summit Ridge
Exhibit B	Summit Ridge Development Plan
Exhibit C	Legal description of the Annexed Parcels
Exhibit D	Master Declaration of Covenants, Conditions and Restrictions and Reservation of Easements
Exhibit E	Design Guidelines; Culinary and Secondary Water Plans; Sewer and Storm Water Management Plans; Public Amenities Plan and Affordable Housing Plan
Exhibit F	Reimbursement Agreement
Exhibit G	City Standards and Specifications for Public Improvements

6.12 **Duration.** This Agreement shall continue in force and effect until all obligations hereunder have been satisfied. Developer shall record the approved Summit Ridge Plat within 30 days of the later of the City's adoption of an annexation ordinance to annex Summit Ridge Project Area and full execution of this Agreement. The Planned Community Program for the Summit Ridge Project Area granted herein shall continue in force and effect for twenty (20) years from its issuance; provided that this Agreement shall become null and void in the event that (i) initial construction of the infrastructure does not begin within three (3) years of the date of this Agreement, or (ii) construction and development cease for a period of five (5) consecutive years during the term of the Agreement. Upon expiration of the twenty (20) year period, all approvals or development rights and obligations of the City shall lapse unless extended for up to ten years by the City Council.

6.13 **Acknowledgment.** By their signature below, each of the Owners acknowledges that the respective parcel of property owned by such Owner at the time of execution of this Agreement shall be subject to all of the terms and conditions of this Agreement upon execution by all Parties. The City,

Developer and each Owner further acknowledge that all rights and obligations of Developer herein shall also mean the right and obligation of each Continuing Owner, except those rights and obligations set forth in Section 5.5 and except as specifically provided otherwise herein.

6.14 Amendment of Prior Annexation Agreement. To the extent this Agreement is inconsistent with that certain Annexation and Development Agreement entered into December 18, 1996 and recorded January 10, 1997 as entry #2551 in Book 4167 at Page 88 of the official records of the Utah County Recorder affecting a portion of the Summit Ridge Project Area, that agreement is amended to reflect the provisions set forth herein.

6.15 Concurrency. The City desires that the resources, services and facilities needed to support progressing development are available concurrent with the impacts of such development. Notwithstanding any provision in this Agreement, no development permit will issue in the event that concurrent infrastructure and services are not available to serve the contemplated development.

6.16 Insurance and Indemnification. Developer hereby agrees to defend and hold the City and its officers, employees and consultants harmless for any and all claims, liability and damages arising out of any work or activity of Developer, its agents or employees permitted pursuant to this Agreement.

6.16.1 Hazardous, Toxic, and/or Contaminating Materials. Developer further agrees to defend and hold the City and its elected and/or appointed boards, officers, agents, employees and consultants harmless from any and all claims, liabilities, costs, fines, penalties and/or charges of any kind whatsoever relating to the existence and removal of hazardous, toxic and/or contaminating materials on the Summit Ridge Project Area, except where such claims, liability costs, fines, penalties, charges and/or claims are due to the actions of the City or its elected or appointed boards, officers, agents, employees or consultants.

6.16.2 Bodily Injury and Property Damage Insurance. Developer agrees to and shall indemnify and hold the City and its elected and appointed boards, officers, agents, employees, and consultants harmless from and against all liability, loss, damage, costs, or expenses (including reasonable attorneys' fees and court costs) rising from or as a result of the death of any person, or any accident, injury, loss or damage to any person or property directly caused by any acts done or omissions of Developer or its agents, servants, employees or contractors in connection with this Agreement, except for wilful misconduct or negligent acts or omissions of the City or its elected or appointed boards, officers, agents, employees or consultants.

6.16.3 Insurance Certificates. Prior to beginning construction on the Project, Developer shall furnish or cause to be furnished to the City certificates of insurance as follows: (a) comprehensive general liability (bodily injury and property damage); blanket contractual liability; and personal injury liability, all with limits not less than \$2,000,000 combined single limit per occurrence; and automobile liability, including owned, hired and non-owned vehicles, up to \$1,000,000; (b) endorsements shall be obtained for the policies providing the above insurance for the following three provisions:

(a) The City is added as an additional named insured with respect to the Project and this Agreement;

(b) The policy shall not terminate or be canceled or the coverage reduced until after thirty (30) days written notice is given to the City;

(c) The policy and coverage as is afforded to the City shall be primary insurance and not contributing with any other insurance maintained by the City.

6.17 **Nondiscrimination.** Neither the City nor Developer nor any Owner, nor the agents, employees, or representatives of any of them, shall discriminate against, segregate, persecute, oppress, or harass one another's agents, employees, or representatives; other developers (including any potential replacement developer); contractor or subcontractor; or the agents, employees, or representatives of any of the foregoing; tenants, owners, occupants or residents, whether actual or potential, or any other person or entity.

6.18 **Ekins Home.** The City agrees that the approximately two acre home and outbuilding site owned by the Shirl L. Ekins Family Trust and located on the northern portion of the Summit Ridge Project Area is a pre-existing non-conforming use for residential purposes which include storage of farm equipment; provided that such portion of the Summit Ridge Project Area is not used for any industrial or commercial purpose.

6.19 **Failure to Execute.** The failure of any Party named above to execute this document shall not invalidate this Agreement with respect to any of the remaining Parties or the property owned by such Parties at the time of execution; provided that the total density and Summit Ridge Development Plan shall be modified to remove that parcel and the applicable density and infrastructure.

IN WITNESS WHEREOF, this Agreement has been executed by Summit Ridge Development, LLC, by persons duly authorized to execute the same, by the City of Santaquin, acting by and through its City Council and by each of the Owners by duly authorized persons as of the 7 day of ~~September~~, ~~December~~ 2000.

SANTAQUIN CITY

By: [Signature]
Its Mayor

ATTEST: City Recorder

By: [Signature]
Susan Farnsworth, City Recorder

APPROVED AS TO FORM:

[Signature]
Mitchell D. Maughan, City Attorney
[Signature]

DEVELOPER:

SUMMIT RIDGE DEVELOPMENT, LLC
a Utah limited liability company

By: [Signature]
R. Kent Kunz, Managing Member

OWNERS:

SOUTH COUNTY DEVELOPMENT, L.C.

By: [Signature]
Its: Member

SHIRL L. EKINS FAMILY TRUST

By: Shirl L. Ekins, Trustee
Shirl L. Ekins, Trustee

SHIRL L. EKINS FAMILY IRREVOCABLE TRUST

By: Lori Ann Ekins Dunn, Trustee
Lori Ann Ekins Dunn, Trustee

UTAH S.H.O.P., LLC, a Utah limited liability company

By: Don Loren
Its: Managing Member

DARYL J. KAY FAMILY TRUST

By: Daryl J. Kay
Daryl J. Kay, Trustee

By: Darlene Kay
Darlene Kay, Trustee

Willis Howard Morgan
WILLIS H. MORGAN

[Signature]
COY MORGAN, an individual

STATE OF UTAH, ACTING THROUGH
THE SCHOOL AND INSTITUTIONAL
TRUST LAND ADMINISTRATION

Date: October 31, 2000

By: David T. Terry
Its: DIRECTOR

APPROVED AS TO FORM:
JAN GRAHAM
ATTORNEY GENERAL
By: [Signature]

EXHIBIT A

LEGAL DISCRPTION

EXHIBIT A
(Entire Summit Ridge Project Area)

Property situated in Utah and Juab Counties in the State of Utah and more particularly described as follows:

WEST PARCEL.

Beginning at the Southeast Corner of Section 16, Township 10 South, Range 1 East, Salt Lake Base & Meridian; thence S89°46'12"W along the Section line 2621.27 feet to the South ¼ Corner of Section 16; thence S89°46'13"W along the Section line 2621.01 feet to the Southwest Corner of Section 16; thence N0°33'02"W along the Section line 2677.35 feet to the West ¼ Corner of Section 16; thence N4°36'19"W along the Section line 2643.61 feet to the Southwest Corner of Section 9; thence N0°56'29"W along the Section line 2627.55 feet to the West ¼ Corner of Section 9; thence N0°54'43"W along the Section line 2629.64 feet to the Southwest Corner of Section 4; thence N0°11'38"W along the Section line 2684.79 feet to the West ¼ Corner of Section 4; thence N89°23'49"E along the ¼ Section line 2656.93 feet to the Center of Section 4; thence S0°12'46"E along the ¼ Section line 2640.84 feet to the North ¼ Corner of Section 9; thence N89°20'52"E along the Section line 2692.74 feet to the Southwest Corner of Section 3; thence N0°40'50"W along the Section line 1319.24 feet; thence N89°49'45"E 1316.48 feet; thence S0°35'46"E 441.35 feet; thence N89°42'00"E along a fenceline 600.00 feet; thence N89°43'00"E along a fenceline 866.00 feet; thence S89°39'00"E 119.27 feet to the westerly right-of-way line of the Union Pacific Railroad; thence Southwesterly along the arc of a 1965.00 foot radius non-tangent curve (radius bears: S57°42'49"E) 499.98 feet through a central angle of 14°34'42" (chord: S24°59'50"W 498.63 feet); thence S89°03'00"W 52.70 feet; thence Southwesterly along the arc of a 2015.00 foot radius non-tangent curve (radius bears: S72°46'17"E) 447.70 feet through a central angle of 12°43'48" (chord: S10°51'49"W 446.77 feet); thence S89°55'46"E along the Section line 50.15 feet to a point located N89°55'46"W 36.08 feet from the North ¼ Corner of Section 10; thence Southwesterly along the arc of a 1965.00 foot radius non-tangent curve (radius bears: S85°23'19"E) 107.28 feet through a central angle of 3°07'41" (chord: S3°02'51"W 107.27 feet); thence S1°29'00"W 377.70 feet; thence along the arc of a 2855.00 foot radius curve to the right 322.59 feet through a central angle of 6°28'26" (chord: S4°43'13"W 322.42 feet); thence N86°30'00"W 30.09 feet; thence Southwesterly along the arc of a 2825.00 foot radius non-tangent curve (radius bears: N81°59'43"W) 495.91 feet through a central angle of 10°03'28" (chord: S13°02'01"W 495.27 feet); thence S18°03'45"W 60.75 feet, the previous 10 (ten) courses along said right-of-way; thence West 1059.13 feet; thence South 2,640.00 feet; thence East 626.87 feet to the westerly right-of-way line of the Union Pacific Railroad; thence N87°51'23"E 200.39 feet to the easterly right-of-way of said Railroad; thence S1°26'00"W along said right-of-way 5371.43 feet; thence N64°07'19"W 67.13 feet; thence N61°08'00"W 47.10 feet; thence N60°48'41"W 83.05 feet; thence N62°24'35"W 26.28 feet to said westerly right-of-way; thence N62°24'35"W 179.92 feet; thence N67°55'10"W 285.97 feet; thence N76°39'17"W 140.80 feet; thence S87°08'15"W 80.10 feet; thence N68°32'14"W 113.09 feet; thence N67°00'36"W 48.34 feet; thence N62°08'32"W 94.16 feet; thence N61°34'44"W 48.32 feet; thence N41°02'50"W 90.99 feet; thence N45°34'02"W 89.28 feet; thence N33°28'51"W 82.55 feet; thence N33°17'14"W 117.98 feet; thence N35°51'49"W 155.33 feet; thence N31°19'11"W 201.03 feet; thence N36°31'35"W 396.51 feet; thence N31°23'47"W 67.52 feet; thence N89°42'18"W along the Section line 62.48 feet to the East ¼ Corner of Section 16; thence S1°26'07"E along the Section line 2725.41 feet to the point of beginning.

Contains: 1,898.82 acres

EAST PARCEL

Beginning at a point located $N0^{\circ}05'18''W$ along the Section line 662.03 feet from the Southwest Corner of Section 11, Township 10 South, Range 1 East, Salt Lake Base & Meridian; thence $N89^{\circ}23'55''E$ 1322.56 feet; thence $S0^{\circ}22'12''E$ along the $1/16^{\text{th}}$ Section (40 acre) line 166.00 feet to the westerly right-of-way line of a Interstate 15 frontage road; thence Southwesterly along the arc of an 1800.00 foot radius non-tangent curve (radius bears: $N58^{\circ}10'46''W$) 582.02 feet through a central angle of $18^{\circ}31'35''$ (chord: $S41^{\circ}05'02''W$ 579.49 feet; thence $S61^{\circ}59'00''W$ 337.00 feet to a right-of-way marker; thence $S71^{\circ}41'52''W$ 286.24 feet; thence Southwesterly along the arc of an 897.72 foot radius non-tangent curve (radius bears: $S22^{\circ}17'42''E$) 1096.78 feet through a central angle of $70^{\circ}00'00''$ (chord: $S32^{\circ}42'18''W$ 1029.83 feet) to a right-of-way marker; thence $S2^{\circ}17'42''E$ 234.82 feet; thence along the arc of an 874.16 foot radius curve to the left 503.48 feet through a central angle of $33^{\circ}00'00''$ (chord: $S14^{\circ}12'18''W$ 496.55 feet) to a right-of-way marker; thence $S30^{\circ}42'18''W$ 1526.35 feet; thence $S30^{\circ}15'38''W$ 686.95 feet, the previous 8 (eight) courses along said frontage road; thence $N89^{\circ}56'17''W$ 928.35 feet; thence $S48^{\circ}27'55''W$ 315.74 feet; thence $N0^{\circ}06'19''W$ 633.53 feet; thence $N89^{\circ}06'00''W$ 686.49 feet to the easterly right-of-way line of the Union Pacific Railroad; thence $N1^{\circ}26'00''E$ along said right-of-way 4566.13 feet; thence $S89^{\circ}07'43''E$ 492.94 feet to a point on the $1/4$ Section line of Section 10; thence $N0^{\circ}19'10''W$ along the $1/4$ Section line 152.42 feet; thence $S89^{\circ}59'30''E$ along the extension of, and along an existing fenceline, 2665.72 feet to a point on the Section line; thence $S0^{\circ}05'18''E$ along the Section line 819.82 feet to the point of beginning.

Contains: 351.06 acres

EXHIBIT B

SUMMIT RIDGE DEVELOPMENT PLAN

EXHIBIT C

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**LEGAL DESCRIPTION OF
THE ANNEXED PARCELS**

EXHIBIT C

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The land previously annexed into Santaquin City land located in the Summit Ridge Project Area situated in the State of Utah, County of Utah described as follows:

Beginning at a point located South 231.03 feet and West 4870.30 west from the Northeast Corner of Section 14, Township 10 South, Range 1 East, Salt Lake Base and Meridian; thence $S71^{\circ}41'13''W$ 19.42 feet; thence along the arc of an 898.51 foot radius curve to the left 1097.74 feet (chord: $S32^{\circ}40'23''W$ 1030.73 feet); thence $S02^{\circ}19'37''E$ 235.03 feet; thence along the arc of an 874.93 foot radius curve to the right 503.92 feet (chord: $S14^{\circ}10'23''W$ 496.99 feet); thence $S30^{\circ}17'48''W$ 1130.46 feet; thence $S31^{\circ}22'44''W$ 714.78 feet; thence $S28^{\circ}28'47''W$ 388.22 feet; thence $N89^{\circ}56'17''W$ 924.06 feet; thence $S48^{\circ}27'55''W$ 323.10 feet; thence $N00^{\circ}06'20''W$ 638.39 feet; thence $N89^{\circ}06'00''W$ 687.24 feet; thence $N01^{\circ}38'36''E$ 585.39 feet; thence $N01^{\circ}19'17''E$ 738.79 feet; thence $N01^{\circ}22'18''E$ 761.59 feet; thence $N01^{\circ}30'09''E$ 1145.78 feet; thence $N01^{\circ}31'42''E$ 424.16 feet; thence $N01^{\circ}19'53''E$ 616.35 feet; thence $N01^{\circ}16'55''E$ 267.85 feet; thence $N01^{\circ}26'54''E$ 26.65 feet; thence $S89^{\circ}07'30''E$ 521.10 feet; thence North 155.26 feet; thence East 2640.00 feet; thence South 797.49 feet; thence East 1353.39 feet; thence South 102.31 feet; thence $S36^{\circ}23'31''W$ 262.97 feet; thence along the arc of a 1223.24 foot radius curve to the right 363.54 feet (chord: $S42^{\circ}41'14''W$ 362.20 feet); thence $S61^{\circ}03'41''W$ 202.76 feet; thence $S67^{\circ}54'59''W$ 411.12 feet to the point of beginning.

Contains: 350.69 acres

EXHIBIT D

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**MASTER DECLARATION OF COVENANTS,
CONDITIONS AND RESTRICTIONS
AND RESERVATION OF EASEMENTS**

When Recorded, Return To:
Diane H. Banks, Esq.
Fabian & Clendenin
215 S. State St., #1200
Salt Lake City, UT 84111

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**MASTER DECLARATION OF COVENANTS, CONDITIONS AND
RESTRICTIONS AND RESERVATION OF EASEMENTS
FOR
SUMMIT RIDGE
A PLANNED COMMUNITY DEVELOPMENT**

in

Utah and Juab Counties, Utah

THIS MASTER DECLARATION OF COVENANTS, CONDITIONS AND RESTRICTIONS AND RESERVATION OF EASEMENTS FOR SUMMIT RIDGE (the "Master Declaration") is made on this 16 day of December, 2000, by SUMMIT RIDGE DEVELOPMENT, LLC, a Utah limited liability company ("Declarant") and is approved and accepted by Grantors, as hereafter defined.

RECITALS:

A. Declarant has entered into option or contractual agreements for the purchase of certain real property from South County Development, L.C., a Utah limited liability company ("South County"), the Shirl L. Ekins Family Irrevocable Trust (the "Ekins Family Irrevocable Trust") and the State of Utah acting through the School and Institutional Trust Lands Administration ("SITLA"). South County, the Ekins Family Irrevocable Trust and SITLA may hereafter be referred to together as "Grantors." The real property owned by Grantors and subject to this Declaration (the "Grantor Property") is more particularly described on Exhibit A-1, attached hereto and incorporated herein by this reference

B. The property described on the attached Exhibit A-2 is presently owned by (i) UTAH S.H.O.P., LLC, a Utah limited liability company (the "Shop Company"), (ii) Darlene and Daryl J. Kay, Trustees of the Daryl J. Kay Family Trust (the "Kay Family Trust"), and (iii)

the Shirl L. Ekins Family Trust (the "Ekins Family Trust"), each parcel of which is more particularly described on Exhibit A-2, attached hereto and incorporated herein by this reference and all of which may together hereafter be referred to as the "Additional Property". The owners of the Additional Property may hereafter together be referred to as the "Additional Property Owners". The Additional Property Owners agree to subject the Additional Property to this Master Declaration.

C. Willis H. and Coy Morgan (the "Morgan") own certain undevelopable property located in Utah County, State of Utah, as more particularly described on Exhibit A-3 attached hereto and incorporated herein by this reference (the "Morgan Property"), which Morgans have agreed to subject to this Master Declaration.

D. The Grantor Property, the Additional Property and the Morgan Property may hereafter be collectively referred to together as the ("Property"), and more particularly described on Exhibit A attached hereto and incorporated herein by this reference.

E. A planned community development known as SUMMIT RIDGE (the "Project") will be developed on the Property as shown on the Summit Ridge Development Plan attached as Exhibit B and incorporated by this reference. The Project contains neighborhood areas and commercial areas and will include a mixture of single-family, multi-family, commercial, industrial and recreational uses. The Project also contains Common Elements, some of which may be used and enjoyed by the general public.

F. In furtherance of a common plan of development for the Project, Declarant, Grantors, the Additional Property Owners and Morgan, intend to adopt these master covenants, conditions and restrictions affecting the Property and to reserve easements across certain portions of the Property for the benefit of other portions of the Property and any After-Acquired Property. Grantors agree to convey the Grantor Property, each pursuant to its respective agreement with Declarant, subject to these master covenants, conditions, and restrictions, and subject to and together with such easements herein provided, all of which shall run with the title to the Property.

G. Declarant has created the Summit Ridge Master Association to which Declarant in due course will delegate and assign (i) the powers of owning, maintaining and administering the Common Elements, (ii) the duties of administering and enforcing this Master Declaration, and (iii) the duties of collecting and disbursing the assessments and charges hereinafter created in connection with the operation, maintenance, repair and replacement of the Common Elements and the functions and obligations of the Master Association created hereunder.

H. Declarant or the Additional Property Owners may also create separate Condominium Associations covering the multi-family, commercial and industrial portions of the Project, which Condominium Associations will maintain common areas (separate from the Common Elements) within the boundaries of those projects, and provide for the management and operation of the Condominium Association, administer and enforce the terms of any Condominium Declaration, and levy and collect assessments, including assessments of the Master Association allocated to the Condominium Association by this Master Declaration.

General

1.1 General Purposes. Declarant and the Additional Property Owners intend to develop the Property as a community to be known as Summit Ridge which will contain neighborhood and commercial areas which will include a mixture of single-family, multi-family, commercial, industrial, and recreational uses. Declarant and the Additional Property Owners intend that this Master Declaration establish and provide for the continued maintenance of the Project as an attractive and desirable community.

1.2 Densities and Entitlements. The densities and entitlements for the Project are generally defined in the Annexation and Development Agreement between Declarant, Grantors, the Additional Property Owners and Morgan (all together, the "Land Owners") and the City of Santaquin, dated _____, 2000 which sets forth the right to develop the Project to include up to Three Thousand Three Hundred Twenty-Two (3,322) residential units, plus 1,800,000 square feet of commercial and industrial buildings. Additional residential units and commercial development may be approved for After-Acquired Property. More particularly, and subject to possible reallocations of residential density, the Project will consist generally of the following:

- (a) Single Family Residential Detached Homes;
- (b) Multi-Family Uses; and
- (c) Commercial Uses.

1.3 After-Acquired Property. Subject to any approvals required from the City, Declarant reserves the right to subject the After-Acquired Property to this Master Declaration by the recordation of a supplemental declaration. No amendment to this Master Declaration will be required to effect such action. Declarant shall identify in the supplemental declaration the number of additional Lots and Units to be added to the Project, the number of votes to be allocated to the After-Acquired Property and the number of Assessment Units to be allocated to the After-Acquired Property. Upon recordation of the supplemental declaration, the subject After-Acquired Property shall be deemed added to the Property and the number of Lots, Units, votes and Assessment Units shall be automatically increased to include the After-Acquired Property's Lots, Units and other items for purposes of this Master Declaration. The supplemental declaration may modify any of the covenants, conditions and restrictions otherwise applicable to the Property in the supplemental declaration where such changes are deemed necessary, in the discretion of the Declarant, to address a unique condition affecting or relating to the After-Acquired Property that is the subject of the supplemental declaration or to more fairly allocate the benefits and obligations of membership within the Master Association.

1.4 Master Association and Neighborhood Associations. Declarant has created the Summit Ridge Master Association as a Utah non-profit corporation. The members of the Master Association will be Declarant, the Owners of Lots and Condominium Associations. The votes

shall be allocated among those Members as set forth in Section 3.14 below. Declarant or the Owners of Lots in any Neighborhood may also create a Voluntary Neighborhood Association of Lot Owners but such association shall not have any voting rights hereunder. Declarant intends to delegate and assign the power of owning, maintaining and administering the Common Elements and the duties of administering and enforcing this Master Declaration and of collecting and disbursing the assessments and charges hereinafter created to the Master Association.

1.5 Dedication. In order to further the general purposes stated above, Declarant, the Land Owners and Morgans hereby declare that all of the Property, and any of the After-Acquired Property hereafter made subject to this Master Declaration by the recordation of a supplemental declaration, shall at all times be owned, held, sold, conveyed, occupied, used, and enjoyed subject to the provisions of this Master Declaration and to the covenants, conditions, restrictions, equitable servitudes, reservations, easements, assessments, charges, and liens provided, referred to or incorporated herein, all of which shall run with the Property (and any of the After-Acquired Property made subject hereto), and all of which shall burden, benefit, and be binding upon Declarant Grantor, the Land Owners and Morgans and all other persons or entities having any right, title or interest in the Property (and any of the After-Acquired Properties made subject hereto), or any portion thereof, and their respective successors, assigns, heirs, devisees and personal representatives.

1.6 Right to Develop. The foregoing notwithstanding, no provision of this Master Declaration is intended or shall be construed to prevent or limit the rights to develop the Project and to exercise the rights reserved by Declarant and the Additional Property Owners as hereinafter provided.

ARTICLE 2

Definitions

2.1 Unless otherwise expressly provided herein, capitalized words and phrases used in this Master Declaration shall have the following meanings:

“Additional Property” means that property within the Summit Ridge Project Area described on the attached Exhibit A-2.

“Additional Property Owners” means the owner of any parcel of Additional Property as set forth in Recital B above, as such group may be modified by subsequent transfer of any parcel of Additional Property (except an individual lot sale).

“After-Acquired Property” means any parcel or parcels of real property other than property in the Project acquired by Declarant after the execution of this Declaration which are, at the date of this Declaration, adjacent to the Summit Ridge Project Area.

“Annexation and Development Agreement” shall mean that certain agreement described in Section 1.2.

"Articles" shall mean the Articles of Incorporation of the Summit Ridge Master Association, as such Articles may be amended from time to time.

"Base Common Assessment" shall have the meanings set forth in Section 3.24.

"Board" shall mean the Board of Trustees of the Master Association, elected in accordance with the Articles and Bylaws of the Master Association.

"Bylaws" shall mean the Bylaws of the Summit Ridge Master Association, as such bylaws may be amended from time to time.

"Capital Improvement Assessment" shall mean the charge against each Owner and the Owner's Lot and, if applicable, against each Condominium Association and each Unit, representing the portion of the costs to be paid to the Master Association for the installation, construction or reconstruction of any capital improvement on any portion of the Common Elements which the Master Association may from time to time authorize.

"Change in Control Date" shall mean the date on which the Declarant no longer holds any Class C Membership in the Master Association.

"City" means Santaquin City, a third class city of the State of Utah.

"Commercial Lot" shall mean any Lot which is designated for the purpose of conducting a commercial business.

"Commercial Space" shall mean the Commercial Lot and any Unit or other area which may be used, leased, or rented for the purpose of conducting commercial business. Commercial Space includes, without limitation, areas used for retail or wholesale sales, industrial uses, restaurants, barber and beauty shops, fitness facilities, child care facilities, warehouse facilities, real estate sales facilities and recreational activity sales offices. Commercial Space may take the form of condominium units.

"Commercial Unit" shall mean a condominium unit to be used as Commercial Space.

"Common Assessment" shall mean the charge against each Owner and the Owner's Lot, Unit or Multifamily Housing Complex, representing the portion of the Common Expenses which is to be paid by such Owner or other obligor to the Master Association, as more particularly set forth in Section 3.24.

"Common Elements" shall mean all the real property, improvements, facilities and equipment owned and/or managed by the Master Association, or owned by another Person subject to a lease, license, easement or other arrangement in favor of the Master Association. The Common Elements shall exclude all property dedicated to the City and the common areas of any Neighborhood except to the extent covered by an easement in favor of the Master Association. The Common Elements include, without limitation, to the extent of the Master Association's interest therein, roads, walkways, paths, hiking and bicycle trails, street lights,

signs, open space areas, landscaping and landscaping improvements, basins, bridges, retaining walls, drainage devices, swales, stormwater conveyance facilities, and detention basins. The Common Elements within the Property will be specified on the Summit Ridge Development Plan and in supplemental declarations covering each portion of the Property or in other separately recorded documents identifying Common Elements or specifying an interest of the Master Association with respect to a portion of the Property. Common Elements shall also include any communications systems, electronic or fiberoptic network or any security system operated by the Master Association for the benefit of Owners.

“Common Expenses” shall mean the expenses (including allocations for Reserves) incurred or assessed by the Master Association in fulfilling its duties.

“Condominium Association” means a Neighborhood Association, the members of which are condominium unit owners and which represents those Unit Owners within the Master Association through its membership in the Master Association. A Condominium Association does not exist for assessment purposes unless and until a condominium project within the Neighborhood is created by the recording of a survey map.

“Condominium Declaration” shall mean the declaration of covenants, conditions and restrictions and reservation of easements for a particular Condominium Association, as such declaration may be amended from time to time.

“Declarant” shall mean Summit Ridge Development, LLC, a Utah limited liability company, and its successors and assigns to whom Summit Ridge Development, LLC assigns, in whole or in part, the rights of Declarant hereunder by an express written assignment. Declarant may convey all or a portion of the Property for purposes of development with or without assigning its rights as Declarant under this Declaration. Each Neighborhood Association may have a separate Declarant for the purposes of any Voluntary Neighborhood Declaration or Condominium Declaration without affecting Declarant’s rights hereunder.

“Declarant Control Period” shall mean the period commencing on the date on which the Master Association is formed and ending on the Change of Control Date.

“Denominator” shall have the meaning set forth in Section 3.24.

“Design Guidelines” shall mean the Summit Ridge Design Guidelines, adopted by the Board in accordance with the Bylaws and this Master Declaration, as amended from time to time.

“Design Review Committee” shall mean the Design Review Committee for the Project created pursuant to Section 6.1 hereof.

“Developed Parcel” shall mean any parcel of land within the Project which has been platted; provided that any parcel platted by Declarant or any Additional Property Owner shall not become a Developed Parcel until one year following recording of the Plat. In the event any parcel is transferred or conveyed by Declarant or any Additional Property Owner without a Plat

separating such parcel into lots, such parcel shall become a Developed Parcel one (1) year following the transfer, with the number of units in such parcel determined as indicated on the Summit Ridge Development Plan.

"Development Phase" shall mean any separate parcel of Summit Ridge property purchased by Declarant from any of Grantors, the Additional Property Owners or separately transferred to any third party developer.

"Grantor Property" shall mean the real property described on Exhibit A-1.

"Grantors" shall mean South County, the Ekins Family Irrevocable Trust and SITLA.

"Guest" shall mean any family member, tenant or invitee of an Owner, or any family member, tenant or guest of such a person or of the Master Association.

"Improvement" shall mean all structures and appurtenances thereto of every type and kind, including, without limitation, buildings, out buildings, walkways, garages, carports, roads, driveways, parking areas, fences, screening walls, retaining walls, stairs, decks, landscaping, hedges, windbreaks, planting, planted trees and shrubs, and related fixtures and equipment.

"Individual Assessment" shall mean the charge against a particular Owner and the Owner's Lot, Unit or Multifamily Housing Complex directly attributable to the Owner, equal to (i) the charge to such Owner for particular items, services, or benefits provided by the Master Association at such Owner's request, or (ii) the costs incurred by the Master Association for corrective action performed pursuant to the provisions of this Master Declaration, plus interest thereon and fees (including attorney's fees) and costs.

"Land Owners" means South County, the Ekins Family Irrevocable Trust, SITLA, Shop Company, Kay Family Trust, Ekins Family Trust and Morgan.

"Lot" shall mean a Residential Lot or Commercial Lot as shown on a Plat.

"Master Association" shall mean the Summit Ridge Master Association formed by Declarant under the Utah Non-Profit Corporation and Cooperative Association Act, and such association's successors and assigns.

"Master Declaration" shall mean this Master Declaration of Covenants, Conditions, and Restrictions, and Reservation of Easements, as amended from time to time.

"Master Rules" shall mean the Master Rules and Regulations for the Project adopted by the Board in accordance with the Bylaws, as amended from time to time.

"Member" shall mean a member in the Master Association including the Owner of any Residential Lot, or Commercial Lot, a Condominium Association or the Declarant during the Declarant Control Period.

"Mortgage" shall mean any mortgage or deed of trust or other conveyance of a Lot or Unit given to secure the performance of an obligation, and which will be void and reconveyed upon the completion of such performance. The term "deed of trust" or "trust deed" when used herein shall be synonymous with the term "Mortgage".

"Mortgagee" shall mean a person to whom a Mortgage is made and shall include the beneficiary of a deed of trust. The term "first Mortgagee" shall include any Mortgagee who, by virtue of the Owner's Mortgage holds a first and prior lien upon any Lot or Unit superior to the lien of any other Mortgagee.

"Mortgagor" shall mean a person who mortgages the Owner's Lot or Unit to another (i.e., the maker of a Mortgage), and shall include the trustor of a deed of trust.

"Multifamily Housing Complex" shall mean any residential multifamily housing improvement containing more than four residential units, excluding any Condominium Unit.

"Neighborhood" shall mean any separate subdivision or Development Phase within the Project or well-defined area generally identified in the Summit Ridge Development Plan.

"Neighborhood Association" shall mean the homeowners association for any Voluntary Neighborhood Association or any Condominium Association in the Project. A Voluntary Neighborhood Association is an association of Lot Owners which has no right to vote as a unit and whose members have independent voting rights. A Condominium Association is an association of Unit Owners which has voting rights as a unit and whose members have no independent voting rights.

"Open Space Area" shall mean a portion of the Property that is the subject of a use Restriction and specifically identified on recorded Plats or recorded Use Restrictions within the Project.

"Overall Special Assessment" shall mean the charge against each Owner and the Owner's particular Lot, and, if applicable against each Condominium Association and each Unit, representing the portion of the costs to be paid by the Owner or other obligor to the Master Association for unbudgeted expenses or expenses in excess of those budgeted.

"Owner" shall mean the person holding title of record to any Lot or Unit or parcel of property within the Project, including buyers under executory contracts of sale, but excluding those persons having such interest merely as security for the performance of an obligation. For purposes of Membership in the Master Association, voting in the Master Association and being obligated to pay assessments levied against Lots by this Master Declaration, the term "Owner" shall refer only to Owners of Lots, and not Declarant or Land Owners in connection with ownership of the parcels described in Exhibits A-1 or A-2 or the owner of any After-Acquired Property. Owners of Units shall not be members of the Master Association but shall be members of Condominium Associations and shall be assessed by and vote in connection with those Condominium Associations.

"Plans and Specifications" shall mean plans and specifications to be submitted to the Design Review Committee as provided in Section 6.2.

"Plat" shall mean a recorded subdivision plat or record of survey map covering commercial or residential Lots, or any Multifamily Housing Complex on the Property.

"Project" shall have the meaning set forth in the Recitals above.

"Public Rights" shall mean the rights of the public to use the portions of the Property dedicated to the City and the Common Elements on the Property to the extent described herein or in any recorded instrument reflecting such public rights over any portion of the Property.

"Property" shall have the meaning set forth in the Recitals above. The term "Property" shall also later include any of the After-Acquired Property that is made subject to this Master Declaration by the recordation of a supplemental declaration, which inclusion shall be effective from and after the date of recordation of a supplemental declaration.

"Reserves" shall mean those reserves anticipated in Section 3.17 below.

"Residential Lot" shall mean a Lot for single family residential use.

"Residential Unit" shall mean a Unit to be used for residential, rather than commercial purposes.

"SITLA" shall mean the state of Utah acting through the State Institutional Trust Lands Administration.

"Summit Ridge Development Plan" shall mean the Summit Ridge Development Plan for the Project as the same may be amended from time to time. The Summit Ridge Development Plan is attached as Exhibit B for general reference purposes only and is not intended to set forth the final approved configuration of all elements of the Project.

"Trail" shall mean a bicycle, or hiking trail or foot path or a bridal path situated on the Property.

"Undeveloped Parcel" shall mean a parcel designated for future development on a recorded Plat, which identifies the number of Undeveloped Residential Units to be allocated to each such parcel.

"Undeveloped Residential Unit" shall mean a unit of residential density allocated to a specified portion of the Property and which has not been included in a recorded Plat other than a plat creating an Undeveloped Parcel or included in a record of survey map. Undeveloped Residential Units are used for the purpose of identifying certain voting and other rights of Declarant and shall be voted by Declarant as set forth in Section 3.14(c). As of the date of this Master Declaration, the total number of Undeveloped Residential Units on the Property is 3322. When a Developed Parcel is created, the number of Undeveloped Residential Units shall be

reduced by the number of Residential Lots or Residential Units covered by the recorded Plat or map, or if none, as indicated in the Summit Ridge Development Plan.

“Unit” shall mean a ‘condominium unit’ on the Property as that term is defined in the Utah Condominium Ownership Act. The term “Unit” includes Commercial Units and Residential Units unless otherwise specified.

“Use Restriction” shall mean any dedication, conservation easement, open space preservation agreement or other restriction of use by which Declarant, any Land Owner or the Master Association dedicates a certain portion of the Property for continued use as open space and/or for outdoor recreational uses, as the same may be amended from time to time.

“Voluntary Neighborhood Association” means a Neighborhood Association of Lot Owners formed for any purpose or function not inconsistent with the Master Declaration.

“Voluntary Neighborhood Declaration” shall mean the declaration of covenants, conditions, and restrictions and reservation of easements for a particular Voluntary Neighborhood Association, as such declaration may be amended from time to time.

ARTICLE 3

Summit Ridge Master Association

3.1 Relationship of Associations. The Summit Ridge Master Association shall be the Master Association for the Project and shall do such things as are within its powers and as may reasonably be required to maintain the Project and its Common Elements as an attractive and desirable community. The Members of the Master Association shall be Declarant, the Owners of Lots, and the Condominium Associations. A separate Condominium Association will be formed for each Neighborhood containing Condominium Units. Declarant or the Owners of Lots within any Neighborhood shall have the right to form a Voluntary Neighborhood Association for the Neighborhood, but such Association shall not have membership in the Master Association, other than as provided for in Section 3.13 below. The members of a Neighborhood Association shall be Declarant or its delegate and the Owners of Lots or Units in that Neighborhood. The duties and powers of the Master Association shall relate to the Property as a whole, while the duties and powers of a particular Neighborhood Association shall relate only to its particular Neighborhood.

3.2 Duties and Powers of Master Association. The Master Association, acting through the Board, shall have the powers and duties provided in the Articles and Bylaws and such additional powers as shall be reasonable and necessary for the Master Association to accomplish the purposes of this Master Declaration.

3.3 Operation and Maintenance. The Master Association shall be responsible for the operation, management, regulation, maintenance, repair and replacement of the Common Elements except to the extent any such functions are assumed by another entity. In addition, the Master Association may operate, manage, maintain, and repair other areas and facilities within the Project as the Board may determine to be in the best interests of the Owners and the Project

generally and to the extent necessary to comply with any maintenance agreements entered into between Declarant or the Master Association and any governmental entity. Without limiting the foregoing, the Master Association shall operate, manage, regulate, maintain, repair and replace:

(a) All private roads, walkways, drainage and stormwater devices, bridges, tunnels, gates and gate houses, parking areas and facilities, recreational amenities, and other facilities in the Common Elements, including, without limitation, cleaning and periodic resurfacing, snow removal, sanding and salting, trash removal, regulating speed, regulating access through the control gates, revegetation, and the placement of signs.

(b) To the extent owned by the Master Association, wells, water lines, storm drainage and water systems, and related equipment and facilities.

(c) Trees, shrubs, plants and other vegetation in the Common Elements and any Open Space Area owned by the Master Association.

(d) Any surface, subsurface, or above-surface Common Elements including Trails or other Common Elements situated on or crossing any Lot.

(e) To the extent of the Master Association's interest therein, any Commercial Spaces or any Commercial Lot.

3.4 Health and Safety. Neither Declarant nor the Master Association have any obligation to provide services for the maintenance of health and safety within the Project, but the Master Association may, in its sole discretion, provide such services including, without limitation, providing facilities, services, and/or personnel for fire protection, emergency, medical services, security, the collection and disposal of solid waste and refuse, and animal control.

3.5 Administration and Enforcement.

3.5.1 Master Association. The Master Association shall have the power to:

(a) Grant easements or rights-of-way required by utilities to serve the Project.

(b) Employ or contract with a manager to perform all or any part of the duties and responsibilities of the Master Association, and delegate its power to committees, officers and employees.

(c) Take such actions as may reasonably be necessary or desirable to comply with and enforce the Use Restrictions.

(d) Contract with such Persons as may reasonably be necessary or desirable to effectuate the purposes of this Master Declaration, including, without limitation, contractors to collect and dispose of solid waste and refuse, contractors to operate a shuttle or other transportation system within the Project, contractors to maintain the landscaping, contractors to provide security services, and the like.

(e) Own and maintain or dedicate Open Space Areas, and grant and impose restrictive covenants, conditions, restrictions, recreational and trail easements and conservation easements with respect to Open Space Areas owned by the Master Association.

(f) Take such actions as may reasonably be necessary or desirable to enforce the terms and provisions of the Articles, the Bylaws, this Master Declaration, Design Guidelines, or any Neighborhood Declaration, including, without limitation, the power to:

(i) After thirty (30) days' written notice, without being liable to any Owner or Neighborhood Association, enter upon any Lot, Unit or Neighborhood common area, for the purpose of enforcing by peaceful means the provisions of this Master Declaration, the Design Guidelines, or any Voluntary Neighborhood Declaration or Condominium Declaration, or for the purpose of maintaining or repairing any such Lot, Unit or Neighborhood common area if for any reason whatsoever the Owner thereof or other responsible person fails to maintain or repair any such Lot, Unit or Neighborhood common area as required by this Master Declaration.

(ii) After thirty (30) days written notice, without being liable to any Owner, enter upon any Lot, Unit or Neighborhood common area, for the purpose of removing any fire hazard on any Lot, Unit or Neighborhood common area which the Owner or other responsible person refuses to remove immediately.

3.5.2 Enforcement of Design Guidelines. The City shall also have the power, but neither the duty nor obligation, to enforce the Design Guidelines, and by its signature below acknowledges such authority.

3.6 Insurance. The Master Association shall maintain such policy or policies of liability and fire insurance with respect to the Common Elements and personal property owned by the Master Association as provided herein.

3.7 Assessments. The Master Association shall levy and collect all assessments as provided herein.

3.8 Rules and Design Guidelines. The Master Association shall adopt and may from time to time amend Master Rules and Design Guidelines for the Project in order to effectuate this Master Declaration and the purposes of the Project.

3.9 Transportation. The Master Association may provide facilities, services, and/or personnel for the operation of shuttle and other transportation to, from, and within the Project.

3.10 Recreation. The Master Association may provide, operate, and maintain recreational facilities and programs for Owners and guests including, without limitation, clubhouses, spa facilities, the Trails, and other recreational amenities.

3.11 Promotion and Marketing. In addition to the Declarant, the Master Association may conduct programs that do not conflict with the Declarant, for the promotion of the Project as an attractive and desirable community.

3.12 Telecommunications Systems and Access. The Master Association may provide security systems and monitoring services, satellite and cable television facilities and services, other telecommunications systems and access to communications programming within the Project, including internet access via cable or telephone facilities, other audio or video program services, and other telecommunications devices.

3.13 Membership in the Master Association.

(a) Membership Classes. Every Owner of a Lot in the Project shall be a Class A Member of the Master Association. Each Condominium Association shall be a Class B Member of the Master Association. Declarant shall be a Class C Member in the Master Association for so long as it holds any Undeveloped Residential Units.

(b) Class A Membership Appurtenant. The Class A membership of an Owner of a Lot shall not be assignable, except to the successor-in-interest of the Owner, and every Class A membership in the Master Association shall be appurtenant to and may not be separated from the fee ownership of such Lot. Ownership of a Lot shall be the sole qualification for Class A membership in the Master Association.

(c) Transfer of Class A Membership. The Class A membership held by any Owner of a Lot shall not be transferred, pledged, encumbered or alienated in any way, except upon the sale of the Lot giving rise to such membership, and then only to the purchaser of such Lot. Any attempt to otherwise transfer or sever a Class A Membership shall be null and void, and will not be reflected upon the books and records of the Master Association. In the event an Owner of a Lot shall fail to refuse to transfer the Class A membership registered in the Owner's name to the purchaser of the Owner's Lot upon transfer of fee title thereto, the Board shall have the right to record the transfer upon the books of the Master Association. The Board shall have the right to charge a reasonable Specific Assessment against any Owner, and the Owner's Lot, equal to the cost to the Master Association of effectuating any such transfer of the Owner's Class A membership upon the books of the Master Association.

3.14 Voting. The three (3) classes of membership in the Master Association shall be entitled to the following voting rights.

(a) Class A. Every Owner of a Residential Lot shall be a Class A Member and shall be entitled to one (1) vote in the Master Association with respect to such Lot. The Owner of any Multifamily Housing Complex shall be entitled to one (1) vote for each five units therein for which a certificate of occupancy has been issued. The Owner of any Commercial Lot, shall be entitled to one vote for each 10,000 square feet of structural improvements on a Commercial Lot for which a certificate of occupancy has been issued.

When more than one Person owns any Lot ("co-owner"), all such co-owners shall be Members and may attend any meetings of the Master Association, but only one such co-owner shall be entitled to exercise the vote to which the Lot is entitled. Such co-owners may from time to time all designate in writing one such co-owner to vote. Where no voting co-owner is designated or if such designation has been revoked, the votes for such Lot shall be exercised as the majority of the co-owners of the Lot mutually agree. Unless the Board receives a written objection from a co-owner, it shall be conclusively presumed that the voting co-owner is acting with the consent of the other co-owners. No votes shall be cast for any Lot where the majority of the co-owners present in person or by proxy and representing such Lot cannot agree to said vote or other action. All agreements and determinations lawfully made by the Master Association in accordance with the voting procedures established herein, or by the Bylaws, shall be deemed to be binding on all Owners, their successors and assigns. The voting and non-voting co-owner or co-owners shall be jointly and severally responsible for all of the obligations imposed upon the jointly owned Lot. Said voting rights shall be subject to the restrictions and limitations provided in the Master Declaration and in the Articles and Bylaws. The number of Class A Members shall increase by the number of Lots in any After-Acquired Property.

(b) Class B. The votes of each Condominium Association shall be cast by authorized representatives of the Condominium Association, which representatives shall be entitled to attend any meetings of the Master Association. Any residential Condominium Association shall be entitled to one (1) vote in the Master Association for each five condominium units and any commercial Condominium Association shall be entitled to one vote in the Master Association for each 50,000 square feet of structural improvement on the property in that association for which certificates of occupancy have been issued. The votes of each Condominium Association may be cast in total or split at the discretion of the Condominium Association. In the event there are Condominium Units included in any After-Acquired Property, the number of Class B votes shall increase by (i) 1/5 of the number of added residential Condominium Units or (ii) one vote per 50,000 square feet of additional Commercial Space, as the case may be.

(c) Class C. Declarant shall be a Class C Member of the Master Association and shall be entitled to one half (0.5) of a vote for each Undeveloped Residential Unit held by it. The Class C membership with respect to Undeveloped Residential Units shall terminate with respect to any Undeveloped Residential Unit at the time of transfer or conveyance of affected property to a third party.

3.15 Voting. Unless a greater than simple majority of the membership is specified as being required in the Articles or unless any decision is specified in the Bylaws or this Master Declaration as requiring the approvals of a particular class of Members, any provision requiring the vote or approval of the Members shall require the approval of a simple majority of all Members votes present in person or by proxy at a meeting of the Members at which a quorum is present. In the event any provision of this Master Declaration or the Articles or Bylaws requires the approval of a particular class of membership of the Master Association such requirement shall be deemed to require a simple majority of all votes of the class present in person or by proxy at a meeting of the Members at which a quorum of the class is present.

3.16 Notice and Quorum. Written notice of any meeting called for the purpose of taking any action by the Members shall be sent to all Members (who have provided a written notice of address to the Master Association) not less than thirty (30) days, nor more than sixty (60) days, in advance of the meeting. At the first such meeting called, the presence of the Members or of proxies entitled to cast fifty-one percent (51%) of all votes of the Master Association (or all votes of a particular class of Membership, if applicable) eligible to be cast at said meeting shall constitute a quorum as to all Members (or that class of membership). If the required quorum is not present, another meeting may be called by giving not less than ten (10) days notice in advance of the meeting, and the required quorum at the subsequent meeting shall be twenty-five percent (25%) of the voting power of the entire membership or membership class in question. No such subsequent meeting shall be held more than thirty (30) days following the preceding meeting.

3.17 Assessments. The Master Association shall have the right to levy and collect Common Assessments, Individual and Overall Special Assessments and Capital Improvement Assessments as provided in this Section. Assessments on Units may be levied on and delivered to the Condominium Association or to individual Unit Owners, at the discretion of the Master Association, so long as duplicate levies are not made. Unless specified otherwise herein, any reference in this Section 3.17 to assessment of a Unit shall also be deemed to include the Condominium Association.

(a) Purpose of Common Assessments. The Common Assessments levied by the Master Association shall be used to promote the common health, safety, benefit, recreation and welfare of the Owners, to meet any obligations imposed on, incurred or assumed by the Master Association, to cover costs, including overhead and administrative costs, for the operation of the Association and the operation, management, maintenance, repair, and replacement of the Common Elements, and to establish impound accounts as may be required by any governmental entity. The Common Assessments may also be used to establish adequate Reserves for maintenance, repair, and replacement of the Common Elements. Common Assessments shall be levied against each Lot, Unit or Multifamily Housing Complex and the Owner thereof, and shall be payable in such manner and at such times, including monthly or quarterly installments, as the Board may determine.

(i) Basis of Common Assessments. The total Common Assessments shall be based on advance estimates of cash requirements by the Master Association to provide for payment of all estimated expenses growing out of or connected with the operation of the Association and the operation, management, maintenance, and repair of the Common Elements, which estimates may include, among other things, expenses of snow removal, taxes, special assessments, premiums for all insurance which the Master Association is required or permitted to maintain pursuant thereto, repairs and maintenance, wages for Master Association employees, compensation of a manager, legal and accounting fees, the creation of reasonable Reserves, surplus and/or sinking funds for the replacement of capital items and other purposes, and any other expenses and liabilities which may be incurred by the Master Association for the benefit of the Owners. Common Assessments shall be made on a calendar year basis. The amount of the Common Assessments shall be initially proposed by the Board, and presented to a meeting of the Owners for approval. Notice of the proposed assessment for the ensuing year shall accompany

the notice of the meeting, and shall be mailed to each Owner (who has provided a written notice address to the Master Association) not later than thirty (30) days prior to the date set for said meeting. Said notice shall also set forth the estimated Base Common Assessment for each Owner for the calendar year covered by said assessments, determined as provided in Section 3.24. Common Assessments representing particular cost items may, but shall not be required to, be allocated to particular Residential or Commercial Lots, Units or Multifamily Housing Complex, depending on the extent of benefit received by the particular Lots, Units or Multifamily Housing Complex in question (as determined by the Board in the exercise of its discretion), and therefore, Common Assessments may not be the same for all Lots or all Units.

(ii) Reserves. Common Assessments may include reasonable amounts as determined by the Board collected as Reserves for the future periodic maintenance, repair and replacement of all or a portion of the Common Elements, or for any other purpose as determined by the Board. All amounts collected as Reserves, whether pursuant to this Section or otherwise, shall be deposited by the Board in a separate bank account to be held in trust for the purposes for which they are collected. Said amounts shall be segregated from and not commingled with any other funds of the Master Association. Such Reserves shall be deemed a contribution to the capital account of the Master Association by the Members.

(b) Purpose of Individual Special Assessments. Special Assessments levied by the Master Association shall be levied against a particular Lot, Unit or Multifamily Housing Complex and the Owner thereof, to cover costs, including overhead and administrative costs, for:

(i) Providing particular services, items, or benefits to a Lot, Unit or Multifamily Housing Complex at the request of the Owner thereof pursuant to a list of snow removal, landscape maintenance, and handyman services, and which assessments may be levied in advance of providing such special services.

(ii) Enforcing any provision of the Articles, Bylaws, this Master Declaration, any Neighborhood Declaration, the Master Rules, or the Design Guidelines against any Owner, or of bringing any Lot, Unit or Multifamily Housing Complex into compliance with such requirements.

(iii) Maintenance, repairs, or replacements of or within the Common Elements arising out of or caused by the willful or negligent act or omission of an Owner or Condominium Association or the guests of any of them.

(c) Purpose of Overall Special Assessments. Overall Special Assessments shall be levied from time to time to cover unbudgeted expenses or expenses in excess of those budgeted. Except as otherwise provided in the Articles, Bylaws, or in this Master Declaration, or Overall Special Assessment shall require the affirmative vote or written consent of a majority of Members. Overall Special Assessments shall be levied against each Lot or Unit and the Owner thereof, to each then existing Multifamily Housing Complex and shall be payable in such manner and at such times, including installments over time, as the Board may determine.

(d) Purpose of Capital Improvement Assessments. A Capital Improvement Assessment may be levied from time to time for the purpose of defraying, in whole or in part, the cost of any construction, reconstruction, repair or replacement of a capital improvement of or upon the Common Elements, including fixtures and personal property related thereto; provided, however, that any such assessment in excess of One Hundred Thousand Dollars (\$100,000) shall require the affirmative vote or written consent of a majority of Members. Capital Improvement Assessments shall be levied against each Lot, Unit, Multifamily Housing Complex or Condominium Association and the Owner thereof and shall be payable in such manner and at such times, including installments over time, as the Board may determine.

3.18 Creation of the Lien and Personal Obligation of Assessment. Declarant and each Land Owner, for each Lot, Unit or Multifamily Housing Complex owned by it, hereby covenants and agrees, and each Owner of any such property, by acceptance of a deed therefor, whether or not it shall be so expressed in such deed, is deemed to covenant and agree, to pay to the Master Association all Common Assessments, Individual Special Assessments, Overall Special Assessments, and Capital Improvement Assessments levied as provided herein, and each such assessment together with interest, costs and reasonable attorney's fees for the collection thereof, shall be a charge on the property and shall be a continuing lien upon such property against which such assessment is made. Each such assessment, together with interest, costs and reasonable attorney's fees, shall also be the personal obligation of the person who was the Owner of such property at the time when the assessment fell due. The Master Association shall have lien rights on each individual Unit in a Condominium Association, which rights shall be superior to the lien rights of the Condominium Association; and the lien rights of each Condominium Association to lien the property of individual Unit owners are hereby assigned to the Master Association.

3.19 Adjustment of Assessments. The Master Association may phase-in its budget for assessment purposes during the first three years after the commencement of assessment under Section 3.25 with approximately equal monthly additions so that the amount of the budget (determined based on assumed full operation) collected in the first month will be one-thirty sixth (1/36) of the normal monthly assessment under the full budget, the amount collected in the second month will be two-thirty sixths (2/36) of the normal monthly assessment, and so on, until the full normal monthly amount is collected in the thirty-sixth month. The Master Association shall reduce its expenditures to not exceed its collections in these phase-months. Further, in the event that a Plat is recorded, or any After-Acquired Property is made subject to this Master Declaration, the Board shall have the power to make equitable and reasonable adjustments in the amount of assessments (or installments thereof) so as to take into account (i) any increases in assessments payable to the Master Association resulting from the inclusion of any new Lot, Unit, Multifamily Housing Complex or Condominium Association, in the annexation of any After-Acquired Property, and (ii) any increases in Common Expenses resulting from the inclusion of any new Lot, Unit, Multifamily Housing Complex or Condominium Association within the annexation of the After-Acquired Property.

3.20 No Offsets. All assessments shall be payable in the amount specified by the assessment and no offsets against such amount shall be permitted for any reason, including, without limitation, a claim that (i) the Master Association is not properly exercising its duties and

powers as provided in this Master Declaration, or (ii) an Owner or Condominium Association has made or elects to make no use of the Common Elements.

3.21 Homestead Waiver. Each Owner, to the extent permitted by law, does hereby waive, to the extent of any liens created pursuant to this Master Declaration, whether such liens are now in existence or are created at any time in the future, the benefit of any homestead or exemption laws of the State of Utah now in effect from time to time hereafter.

3.22 Limitations on Certain Increases in Common and Overall Special Assessments. Any provision of this Master Declaration to the contrary notwithstanding, the Board shall not in any fiscal year of the Master Association, without the affirmative vote or written consent of a majority of all Member votes, levy a Common Assessment per Lot which is more than ten percent (10%) greater than the Common Assessment for such Lot or Unit for the immediately preceding fiscal year of the Master Association. Any provision of this Master Declaration to the contrary notwithstanding, the Board shall not in any fiscal year of the Master Association, without the affirmative vote or the written consent of a majority of all Members votes, levy a Overall Special Assessment against each Lot or Unit which, when aggregated as to all Lots and Units, exceeds ten percent (10%) of the Common Expenses of the Master Association for such fiscal year. The foregoing to the contrary notwithstanding, the Board may increase Common Assessments and Overall Special Assessments which are subject to the foregoing limitations in an "emergency situation" which is defined as any one of the following: (i) an extraordinary expenditure or the increase of an impound account balance required by order of court or any governmental entity with jurisdiction on any portion of the Project; (ii) an extraordinary expenditure necessary to operate, repair or maintain the Common Elements or any other property for which the Master Association is responsible where a threat to personal safety on the Common Elements or on such other property is discovered or where the expenditure is required as a condition to the confirmation of insurance on any portion of the Project or required by a governmental entity or an agreement with a governmental entity (including without limitation the operation and maintenance of traffic controls and gates); and (iii) an extraordinary expenditure necessary to repair or maintain the Common Elements or any other property for which the Master Association is responsible that could not have been reasonably foreseen by the Board in preparing its budget (however, prior to the imposition and collection of an assessment under this Subsection (iii), the Board shall pass a resolution containing written findings as to the necessity of the extraordinary expense involved and why the expense was not or could not have been reasonably foreseen in the budgeting process, and the resolution shall be distributed to the Members with the notice of the assessment).

3.23 Multiple Assessments Levied Against Lot Resulting from Merger or Combination. Whenever two or more adjacent Lots of an Owner are combined, then the resulting combined new Lot shall be considered a single Lot for all purposes except that for voting and assessments purposes it shall be assessed as two Lots and shall have two Class A Memberships appurtenant to the combined Lot.

3.24 Common Assessments. The Board shall set a base common assessment amount for each calendar year (the "Base Common Assessment") determined pursuant to the provisions of Section 3.17 above. The Base Common Assessment shall be charged and adjusted as follows:

(a) Residential Lots. The Base Common Assessment shall be assessed on all residential lots between the size of 10,000 square feet up to ½ acre. For lots between ½ acre and one acre the Base Common Assessment shall be increased by 10%. For lots in excess of 1 acre the Base Common Assessment shall be increased by 25%. For lots less than 10,000 square feet, the Base Common Assessment shall be decreased by 5% for each 1,000 square feet less than 10,000 square feet to a maximum reduction of 20% for a Lot 6,000 square foot or less.

(b) Commercial Lots. The Base Common Assessment shall be assessed on all commercial lots up to one acre. For lots exceeding 1 acre, the Base Common Assessment will be increased by 5% for each acre in excess of the one acre minimum up to a maximum of 70% for a Lot consisting of 15 or more acres.

(c) Condominium Units. The Master Association shall set and assess a separate Base Common Assessment for Condominium Units, both residential and commercial.

(d) Multifamily Housing Complex. The Master Association shall set and assess a separate Base Common Assessment for Multifamily Housing Complexes.

3.25 Date of Commencement of Assessments. Common and other assessments shall commence (i) on the first day of the month following the day that is 30 days after the recording of a Plat, or (ii) one year following the recording of any Plat recorded by Declarant or any Additional Property Owner (unless such property is transferred or conveyed within the year period, in which case, the assessment shall begin on the day that is 30 days after the recording of the transfer document). The first Common Assessment shall be adjusted according to the number of months remaining in the fiscal year of the Master Association and in accordance with the phase-in provisions of Section 3.19. In the event the amount budgeted to meet Common Expenses for the then current fiscal year proves to be excessive in light of the actual Common Expenses, the Board in its discretion may either reduce the amount of Common Assessments or may abate collection of Common Assessments as it deems appropriate. Nothing in this Section shall require the Board either to abate or reduce the amount of Common Assessments. Notwithstanding the foregoing, (i) neither an abatement nor a reduction in the amount of Common Assessments shall be permitted so long as Declarant is possessed with or controls a majority of the total voting power of the Master Association and of the Board, and (ii) when Declarant no longer is possessed with or controls a majority of the total voting power of the Master Association or the Board, an abatement or reduction in Common Assessments shall only be permitted during a particular fiscal year if the same does not result in a reduction of the quantity or quality of services to the Master Association from those contemplated by the Common Expenses budget for that particular fiscal year.

3.26 Reports to Members. The Board shall cause to be prepared an annual balance sheet and operating statement reflecting income and expenditures of the Master Association for each calendar year, and shall cause to be distributed a copy of each such statement to each Member. The Board shall prepare and distribute to the membership of the Master Association at the time of delivery of notice of each proposed Common Assessment pursuant to Section 3.17, a written, itemized estimate of the expenses to be incurred by the Master Association during such

year in performing its functions under this Master Declaration, less any expected income and accounting for any surplus from the prior year's assessments.

3.27 Excess Funds. At the end of any calendar year of the Master Association, the Board may determine that all excess funds of the Master Association, over and above the amounts used for any purpose, may be returned to the Members proportionately, or may be retained by the Master Association and used for Reserves, to supplement any required impound account or to reduce the following year's Common Assessments.

3.28 Remedies for Non-payment of Assessments: Any installment of a Common Assessment, Overall Special Assessment, or Capital Improvement Assessment not paid within thirty (30) days after the due date shall bear interest from the due date of such installment to the date paid at the rate of eighteen percent (18%) per annum. If any installment of an assessment is not paid within thirty (30) days after it is due, the Owner responsible therefor may be required further by the Board to pay a late charge of Five Dollars (\$5.00) or five percent (5%) of the amount of the delinquent installment, whichever is greater. The Master Association may bring a legal action of law against the Owner personally obligated to pay the same, or foreclose the lien against the Lot or Unit. No Owner may waive or otherwise escape liability for the assessments provided for herein by non-use of the Common Elements or by abandonment of the Owner's property.

(a) Notice of Default. No action shall be brought to enforce any assessment lien herein, unless at least thirty (30) days have expired following the date of Notice of Default is deposited in the United States mail, postage prepaid, to the Owner of the Lot, and a copy thereof has been recorded by the Master Association in the office of the appropriate County Recorder. Said Notice of Default must recite a good and sufficient legal description of the Lot, the record Owner or reputed Owner thereof, the amount claimed (which may at the Master Association's option include interest on the unpaid assessment at eighteen percent (18%) per annum, plus reasonable attorney's fees and expenses of collection in connection with the debt secured by said lien), and the name and address of the claimant. Such Notice of Default shall be signed and acknowledged by an officer of the Master Association, and said lien shall be prior to any declaration of homestead recorded after the date on which this Master Declaration is recorded. The lien shall continue until fully paid or otherwise satisfied.

(b) Foreclosure Sale. Any sale provided for above may be conducted by the Board, its attorney or other persons authorized by the Board in accordance with the provisions of the Utah Code Annotated, 1953 as amended, applicable to the exercise of powers of sale in deeds of trust, by foreclosure as a mortgage, or in any other manner permitted by law. The Master Association, through duly authorized agents, shall have the power to bid on the Lot at foreclosure sale, and to acquire and hold, lease mortgage and convey the same.

(c) Curing of Default. Upon the timely curing of any default for which a Notice of Default was filed by the Master Association, the offices of the Master Association shall record an appropriate Release of Lien, upon payment by defaulting Owner of a fee, to be determined by the Master Association to cover cost of preparing and recording such release.

(d) Certificate as to Indebtedness. A certificate executed and acknowledged by any two (2) members of the Board stating the indebtedness secured by the liens upon any Lot created hereunder shall be conclusive upon the Master Association and the Owners as to the amount of such indebtedness as the date of the certificate, in favor of all persons who rely thereon in good faith.

(e) Cumulative Remedies. The assessment liens and the rights of foreclosure and sale hereunder shall be in addition to and not in substitution for all other rights and remedies which the Master Association and its assigns may have hereunder and by law, including a suit to recover a money judgment for unpaid assessments, as above provided.

3.29 Title to the Common Elements. Upon recording of a subdivision plat creating any individual lot in an Undeveloped Parcel, Declarant or the Land Owner, as the case may be, hereby agrees that it will convey or assign (where Declarant or the Land Owner owns less than fee title) all of its right, title and interest in and to the Common Elements for the Undeveloped Parcel to the Master Association, free and clear of all encumbrances and liens, except for the following:

- (a) Easements, conditions and reservations set forth in this Master Declaration or any Plat.
- (b) Any use restrictions;
- (c) Liens for taxes and assessments;
- (d) the terms of other easements, and reservations interest in the Owner's chain of title, excluding financial liens; and
- (e) The Public Rights.

3.30 Taxes on Common Elements. Taxes or assessments levied or assessed against or upon the Common Elements shall be paid by the Master Association and shall constitute a portion of Common Expenses. Each Owner shall execute such instruments and take such action as may be reasonably specified by the Master Association to obtain separate real estate tax assessments on the Owner's Lot. If any taxes or assessments may, in the opinion of the Master Association, nevertheless be a lien on more than one Lot, such taxes or assessments may be paid by the Master Association, and each Owner shall be obligated to pay or reimburse the Master Association for, as the case may be, the taxes and assessments assessed by the County Assessor or other taxing authority against the Owner's Lot.

3.31 Damage or Destruction to Common Elements. Damage to or destruction of all or any portion of the Common Elements shall be handled in the following manner, notwithstanding any provision in this Master Declaration to the contrary:

- (a) In the event of damage or destruction to any Common Element, and if the insurance proceeds are sufficient to effect total restoration, then the Master Association shall

cause such Common Element to be repaired and reconstructed substantially as it previously existed.

(b) If the insurance proceeds are insufficient to effect total restoration, then the Master Association shall cause such Common Element to be repaired and reconstructed substantially as it previously existed and the difference between the insurance proceeds and the actual cost shall be levied as a Capital Improvement Assessment against each of the Owners, in accordance with the provisions of this Master Declaration.

3.32 Loan to Master Association. The Declarant shall be permitted to make a loan to the Master Association for purposes of funding all expenses of the Master Association prior to the collection of sufficient funds from assessments to pay such expenses. Such loan shall be made on commercially reasonable terms and at an interest rate not to exceed the prime rate as quoted in the Wall Street Journal on the date of the loan. Any such loan shall be evidenced by a promissory note, and Declarant is hereby authorized to execute such note on behalf of the Master Association.

ARTICLE 4

Easements and Third Party Rights

4.1 Easements Reserved by Declarant. Declarant and all Land Owners hereby reserve the easements provided in this Section 4.1.

4.1.1 Construction Easements and Related Rights. Declarant and all Land Owners hereby reserve for the benefit of Declarant and the Master Association these rights from time to time.

(a) to construct, maintain, repair and replace any improvements necessary or required for the full development of the Project on property owned by Declarant, on the Common Elements and on portions of Lots outside of the building areas of Lots designated on the Plat;

(b) to establish and use nonexclusive perpetual utility and other easements, leases, permits or licenses on, over, upon, across, above, under and through the Common Elements for uses including, but not limited to access roads, paths, sidewalks and Trails; any facilities necessary or used for transit purposes, including means of transportation to, from and within the Project; clubhouses; shuttle stops and related structure and signage; mailbox structure; gardens, sprinkler systems and other landscaping changes, improvements and appurtenances (including without limitation, removal of trees and other vegetation subject to any necessary governmental approvals); ponds and water tanks; drainage facilities; monuments; recreational area and facilities; parking areas; ducts, shafts and flues; conduit installation areas (including any fiber optic network); storage facilities for supplies and equipment; earth walls and other road way supports; lights; signage; and

(c) to create other interests, reservations, exceptions and exclusions for the best interest of the Master Association and for the benefit of any Owner or all Owners;

provided that any such action taken and any easement, lease, permit or license, interest, reservation, exception or exclusion established does not unreasonably impair the use of the Common Elements or the building areas of Lots designated on the Plat for their respective intended purposes.

4.1.2 Landscaping and Drainage Easements. Declarant hereby reserves for itself and the Master Association an easement across the Property except the portions thereof occupied by Improvements and within all Common Elements;

(a) to revegetate, beautify or maintain portions of the Property located adjacent to road rights of way;

(b) to beautify and maintain portions of the Property to the extent necessary, in Declarant's judgment, to mitigate through landscaping, any potential negative visual impact of the Project;

(c) to revegetate distributed portions of the Property in order to control erosion, to beautify the Property or to restore Property to a natural condition after damage by natural or man-made causes;

(d) to preserve, improve, maintain, restore and revegetate natural and man-made storm drainage ways across the Property, including the building areas of the Property which include drainage ways, and to convey water in those drainage ways; and

(e) to construct, operate, maintain, repair and replace storm detention and water quality structures on the Property, including within the building areas of Lots or Units where necessary to adequately control surface water.

No Owner of a Lot or Unit shall interfere with the established drainage pattern over the Owner's Lot or Unit. For purposes of this Master Declaration, "established drainage" on any Lot or Unit is defined as the drainage pattern and facility in existence at the time that such Lot or Unit is conveyed to a purchaser by Declarant.

This paragraph reserving rights to landscape or revegetate shall not create an obligation on the part of Declarant or the Master Association to landscape or revegetate any portion of the Property. Further, in the event any such landscaping or revegetation is undertaken by Declarant or the Master Association, the Declarant or the Master Association shall not be obligated to guarantee the survival of or to maintain any landscaping or vegetation installed.

4.1.3 Easements for the Benefit of Owners. Declarant hereby reserves for the benefit of all the Owners, the following described perpetual non-exclusive easements over all portions of Lots located outside of the building envelope designated on the Plats, and over the Common Elements, for the use and enjoyment of the Lots and Units in accordance with this Master Declaration: easements, including any necessary access rights for the installation, maintenance and repair of utilities and services whether publicly or privately supplied, for drainage over, across and upon adjacent Lots and Units for water from normal use of adjoining

Lots, for the installation and maintenance of Trails, for the construction, maintenance and repair of earth walls, slopes, retaining walls and other Common Element supports, and for installation, maintenance and repair of other Common Elements structures and improvements. Such easements may be used by Declarant, its successors, and the Master Association for such purposes reasonably necessary for the use and enjoyment of the Lots and Units and the Common Elements. Declarant further expressly reserves for the benefit of the Master Association easements of access, ingress and egress, over the Lots and Units and the Common Elements, for the purpose of maintaining, repairing and installing water and other utility lines, sewer pipelines and laterals if necessary, in accordance with the provisions of this Master Declaration, and as otherwise provided by law. Declarant also reserves any other easements referred to on any Plat as reserved by Declarant or for the benefit of the Master Association or for the use and enjoyment of Owners of Lots or Units.

4.1.4 Easements for Offices. Declarant hereby reserves the right to construct and maintain offices, prefabricated structures, booths or other structures for administrative, sales and promotional purposes.

4.2 Easements for Benefit of Master Association. Declarant hereby grants to the Master Association, its licensees, invitees, lessees, successors and assigns, a nonexclusive, perpetual easement on, over, upon, across, above, under and through the Property and each portion thereof to (i) exercise any right held by the Master Association under this Master Declaration or any other association documents, and (ii) perform any obligation imposed upon the Master Association by this Master Declaration or any other association documents. Notwithstanding the foregoing, the Master Association shall not enter upon any Lot or Unit without reasonable prior notice of the Owner of the Lot or Unit, except in cases of emergency.

4.3 Other Easements. The Property shall be subject to the following additional easements:

(a) Easements on Plats and of Record. The Property shall be subject to all easements shown on the Plat, and to all easements of record.

(b) Easements for Parking. Temporary guest or recreational parking shall be permitted within the Common Elements only within spaces and areas clearly marked for this purpose. Spaces shall be shown by signs or markings on the paved area. The Master Association is hereby empowered to establish "parking" and "no parking" areas within the Common Elements, as well as to enforce these parking limitations by all means lawful for such enforcement including the removal of any violating vehicle by those so empowered.

(c) Easements for City and County Public Service Use. Declarant hereby reserves and covenants for itself and all future Owners within the Project, easements for city, county, state and federal public services, and for public utilities, including but not limited to, the right of the police to enter upon any part of the Common Elements for the purpose of enforcing the law.

(d) Cable Television. Declarant hereby reserves easements in, upon, over, across and through the Property for the installation of a cable television and/or antenna system, and a fiber optic network, together with the right to cause the Master Association or the City to own all improvements, facilities and equipment thereof including but not limited to any building therefor, equipment therein, pipes, cables, lines and conduits therefor, and any antenna therefor mounted on or in the vicinity of such building (including dish-antenna), and also together with the right to grant and transfer such easements; provided, however, such easements shall not unreasonably interfere with the use and enjoyment by the Members of, or ingress to or egress from or access to, their Lots or Units or the Common Elements.

4.4 Nature of and Creation of Easements. Unless otherwise set forth herein, any easement reserved in this Declaration shall be deemed to be nonexclusive, and each easement in favor of an Owner shall be deemed to be appurtenant to and for the benefit of the Lot or Unit owned by such Owner. Any and all easements reserved in this Declaration shall be deemed to be in full force and effect upon recordation of this Declaration whether or not referred to, reserved and/or granted in any instrument of conveyance.

ARTICLE 5

Owners' Property Rights and Obligations

5.1 Owners' Easements of Enjoyment. Every Owner and the Owner's Guests shall have a non-exclusive right and easement of ingress and egress and of enjoyment in, to and over the Common Elements which right and easement shall be appurtenant to and shall pass with the title of each said Owner's Lot or Unit, subject to the following provisions:

(a) The right of the Master Association to establish uniform rules and regulations pertaining to the use of the Common Elements and any facilities thereon.

(b) The Public Rights.

(c) The covenants, restrictions and requirements of the Use Restrictions.

(d) The right of the Master Association in accordance with the Articles, Bylaws and this Master Declaration, to borrow money for the purpose of improving the Common Elements and in aid thereof, and to mortgage, pledge, deed in trust, or hypothecate any or all of its real or personal property as security for money borrowed or debts incurred, provided that the rights so granted by the Master Association shall be subordinated to the rights of the Owners hereunder.

(e) The right of the Master Association to suspend the voting rights and rights to use the Common Elements, except for ingress and egress to the Owner's Lot or Unit, by an Owner for any period during which any assessment against the Owner's Lot or Unit remains unpaid and delinquent, and for a period not to exceed thirty (30) days for any single infraction of the Master Rules.

(f) The right of the Master Association to dedicate, release, alienate, lease or transfer all or any part of the Common Elements to any public or private entity, agency, authority or utility for such purposes and subject to such conditions as may be agreed to by 66% of all Member votes.

(g) The right of the Master Association to reconstruct, replace or refinish any improvement or portion thereof upon the Common Elements.

(h) The right of the Master Association to plant and maintain trees, shrubs, ground cover and other vegetation upon any portion of the Common Elements or on the Lots under Section 4.1(b).

(i) The right of the Owner of the mineral estate underlying any part of the Property to exercise the Owner's reserved rights with respect thereto:

5.2 No Exemption from Liability. No Owner may exempt himself or herself from personal liability for assessments to be levied by the Master Association, nor release the Lot or Unit or other property owned by him or her from the liens and charges thereof, by waiver of the use and enjoyment of the Common Elements or the facilities thereon or by abandonment of the Owner's Lot or Unit.

5.3 Maintenance Obligations of Owners. Subject to the duty of the Master Association to provide for maintenance as provided in Section 3.3, it shall be the duty of each Owner, at the Owner's sole cost and expense, subject to the provisions of this Master Declaration regarding Design Review Committee approval, to maintain, repair, replace and restore the Owner's Lot or Unit in a neat, sanitary and attractive condition. In the event that any Owner shall permit any Improvement, which it is the responsibility of such Owner to maintain, to fall into disrepair or not to be so maintained so as to create a dangerous, unsafe, unsightly or unattractive condition, or to otherwise violate this Master Declaration, the Board shall have the right, but not the duty, upon thirty (30) days' prior written notice to the Owner of such Lot or Unit, to correct such condition and to enter upon such Owner's Lot or Unit to make such repairs or to perform such maintenance and the cost thereof shall be charged to the Owner. Said cost shall be a Specific Assessment and shall create a lien enforceable in the same manner as other assessments set forth in this Master Declaration.

ARTICLE 6

Design Control

6.1 Design Review Committee. The Design Review Committee shall consist of not less than five (5) members. The term of office shall be two (2) years commencing July 1 of each year; provided, however, that the terms of the initial members of the Design Review Committee shall commence on their appointment and continue through July 1 of year three (3). The Committee shall consist of a chair and two other members selected annually by the Declarant with the two remaining members being selected annually by the Board of the Master

Association. At such time as ninety percent (90%) of the total number of the permitted Units and lots are subdivided and sold or on the twentieth anniversary of the date hereof, whichever comes later, the chair and four members of the Design Review Committee shall be selected by the Board. In addition to its five members, the Design Review Committee may utilize professional consultants including an architect, a landscape architect, and a civil engineer. These professional consultants shall be jointly nominated and selected by the Board of the Master Association. The Design Review Committee shall have and exercise all of the powers, duties and responsibilities set out in this Master Declaration. The Design Review Committee shall meet on such schedules as may be established by the Chairman of the Design Review Committee. A majority of its Members shall constitute a quorum and the majority vote of a quorum present at the meeting shall be sufficient to approve action. Meetings may occur telephonically and actions may be approved by unanimous written consent of all Committee Members.

6.2 Approval by Design Review Committee. No Improvements of any kind, including, without limitation, dwelling houses, swimming pools, ponds, parking areas, mail boxes, fences, walls, tennis courts, garages, driveways, antennae, satellite dishes, flag poles, curbs, and covered walks shall ever be erected, altered, or permitted to remain on any lands within the Property, nor shall any excavating, clearing, removal of trees or shrubs, landscaping or other alteration of existing site conditions be done on any lands within the Property, unless the complete plans and specifications therefor complying with Design Guidelines requirements ("Plans and Specifications") are approved by the Design Review Committee prior to the commencement of such work. The Design Review Committee shall consider the materials to be used on the external features of said buildings or structures, including exterior colors, harmony of external design and existing structures within the Project, the building bulk or mass of said buildings or structures within the Project, the building bulk or mass of said buildings or structures, the location with respect to topography, existing trees and finished grade elevations, and harmony of landscaping with the natural setting and surroundings, and shall ascertain whether the Improvements conform to the Design Guidelines then in effect, this Master Declaration, and the applicable Neighborhood Declaration. The complete Plans and Specifications must be submitted and will be reviewed in accordance with the process described in the Design Guidelines. In the event of a conflict between the Design Guidelines and the applicable regulations or ordinances of any governmental entity having jurisdiction, the latter shall prevail.

6.3 Fee. The Design Review Committee may charge such fee or fees for its review of Plans and Specifications as shall be determined from time to time by the Board or as provided in the Design Guidelines. Such fee or fees shall be reasonable in relation to the work performed and shall be applied uniformly.

6.4 Inspection by Design Review Committee. The Design Review Committee shall have the authority and right at any time and from time to time at any reasonable hour to inspect Improvements under construction for the purpose of determining whether the same comply in all respects with the applicable Plans and Specifications as approved by it, but it shall have no duty to make such inspections.

6.5 Variances. The Design Review Committee has the authority to deviate from the requirements contained in the Design Guidelines in extenuating circumstances, when following this Master Declaration or the applicable Neighborhood Declaration would create an unreasonable hardship or burden for an Owner. An affirmative vote of two-thirds (2/3) of the members of the Design Review Committee must be gained for a variance to be granted. The Design Review Committee does not, however, have authority to allow deviation from the requirements of the city or county having jurisdiction over the subject property.

6.6 General Requirements. The Design Review Committee shall exercise its best judgment to see that all improvements, construction, landscaping, and alterations on the lands within the Project conform and harmonize with the natural surroundings and with existing structures as to external design, materials, color, siting, height, topography, grade and finished grade elevation in keeping with the Design Guidelines, this Master Declaration and any applicable Neighborhood Declaration.

6.7 Ultimate Responsibility. Each Owner shall at all times conform and comply with all approved Plans and Specifications for the Improvements on such Owner's Lot and otherwise conform and comply in all respects with the Design Guidelines, this Master Declaration, and any applicable Neighborhood Declaration, as well as with all applicable laws, ordinances, building codes, rules, regulations, orders and the like of any governmental agency having jurisdiction.

6.8 Plans. The Design Review Committee shall disapprove any plans submitted to it which are not sufficient for it to exercise the judgment required of it by these covenants.

6.9 Written Records. The Design Review Committee shall keep and safeguard complete written records of all applications for approval submitted to it (including one set of all Plans and Specifications so submitted) and of all actions of approval or disapproval and all other actions taken by it under the provisions of this instrument which records shall be maintained for a minimum of five years after the approval or disapproval.

6.10 Procedure of Appeal. In the event Plans and/or Specifications submitted to the Design Review Committee are disapproved or deemed disapproved, the Owner may appeal such disapproval or deemed disapproval in writing to the Board; provided, however, a written notice of appeal specifying the grounds for appeal consisting of any alleged failure by the Design Review Committee to properly apply the Design Guidelines or provisions of this Master Declaration shall be received by the Board not more than thirty (30) days following such disapproval or deemed disapproval. Within thirty (30) days following receipt of such notice of appeal, the Board shall render a written decision determining whether the Design Review Committee properly applied the Design Guidelines, or the provision of this Master Declaration. In the event the Board fails to render such decision within said thirty (30) day period, such disapproval or deemed disapproval of the Design Review Committee shall be deemed to have been affirmed by the Board.

6.11 Non-Liability of Design Review Committee Members. Neither Declarant, the Design Review Committee, any member thereof, nor any duly authorized representative thereof shall be liable to the Master Association, any Neighborhood Association, or to any Owner for

any loss, damage or injury arising out of or in any way connected with the performance of the Design Review Committee's duties hereunder unless due to the willful misconduct or bad faith of the Design Review Committee. The Design Review Committee shall review and approve or disapprove all plans submitted to it for any proposed Improvement, alteration or addition, solely on the basis of compliance with the Design Guidelines, this Master Declaration, any applicable Neighborhood Declaration, aesthetic considerations, and the overall benefit or detriment which would result to the immediate vicinity and the Project generally. The Design Review Committee shall take into consideration the aesthetic aspects of the designs, placement of buildings, landscaping, color schemes, exterior finishes and materials and similar features, but shall not be responsible for reviewing, nor shall its approval of any plan or design be deemed approval of, any plan or design from the standpoint of structural safety or conformance with building or other codes. This clause shall be inapplicable to the extent necessary if any, to actually obtain insurance coverage required by Article 8.

6.12 Variance in Exterior Appearance and Design in Event of Reconstruction. Any Owner whose Lot or Unit has suffered damage may apply for approval to the Design Review Committee for reconstruction, rebuilding or repair of the Owner's Lot or Unit in a manner which will provide for an exterior appearance and design different from that which existed prior to the date of the casualty. Application for such approval shall be made in writing together with full and complete Plans and Specifications showing the proposed reconstruction and the end result thereof. The Design Review Committee shall grant such approval only if the design proposed by the Owner would result in a finished structure in compliance with the then applicable Design Guidelines.

ARTICLE 7

Restrictions on all Property

7.1 Zoning Regulations. No lands within the Property shall ever be occupied or used by or for any building or purpose or in any manner which is contrary to the Annexation and Development Agreement, this Master Declaration, or the applicable Neighborhood Declaration.

7.2 No Mining, Drilling or Quarrying. Except for a water well approved by the Master Association, no Owner or Land Owner shall conduct mining, quarrying, tunneling, excavating or drilling for any substances within the earth, including oil, gas, minerals, gravel, sand, rock, and earth, on the surface of the Property.

7.3 No Business Uses. Except as approved by the Master Association, the Residential Lots and Residential Units within the Project shall be used exclusively for residential living purposes, including condominium and related facilities for overnight stay, such purposes to be confined to approved residential buildings within the Project. No Residential Lots or Residential Units within the Project shall ever be occupied or used for any commercial or business purposes provided, however, that nothing in this Section 7.3 shall be deemed to prevent (a) Declarant or its duly authorized agent from using any Residential Lot or Residential Unit owned by Declarant as a sales office or model, or (b) any Owner or the Owner's duly authorized agent from renting or leasing said Owner's Residential Unit for residential use or, in the case of hotel or lodge Units,

overnight accommodations, (c) any home business use approved by the Master Association, or (d) the use of Commercial Space or a Commercial Lot for commercial purposes.

7.4 Restriction of Signs. With the exception of a sign no larger than six (6) square feet identifying the architect and a sign of similar dimension identifying the prime contractor to be displayed only during the course of construction, and a sign no larger than three (3) square feet for the Owner to advertise the Owner's Lot or Unit for sale, no signs or advertising devices shall be permitted on single family residences, including, without limitation, commercial, political, informational or directional signs or devices, except signs approved in writing by the Design Review Committee in accordance with the Design Guidelines as to size, materials, color and location: (a) as necessary to identify ownership of the Lot or Unit and its address; (b) as necessary to give directions; (c) to advise of rules and regulations; (d) to caution or warn of danger; and (e) as may be required by law. Any approved signs shall be located as a location approved by the Design Review Committee. The Design Review Committee may develop comprehensive sign regulations. The Declarant may erect such signs in a size and color as it deems appropriate for the advertising and sale of the Project.

7.5 Restrictions on Animals. No animals other than ordinary household pets may be kept or allowed to remain on any Lot or Unit. Such ordinary household pets may not be kept or allowed to remain on any Lot or Unit unless and until written authorization is obtained from the Board, and no more than two ordinary pets shall be allowed on any Lot or Unit. The Board, in its sole discretion, shall have the right to revoke such authorization at any time in its sole discretion and shall have the power to require any Owner or Guest to remove any animal or other pet belonging to it which is not disciplined or which constitutes an undue annoyance or a danger to other Owners, their Guests, or others. Areas permitting livestock are exempt from this provision.

7.6 Underground Utility Lines. All water, gas, electrical, telephone, and other permanent utility lines within the limits of the Property must be buried underground and may not be exposed above the surface of the ground.

7.7 Service Yards. All equipment, service yards or storage piles on any Lot or Unit shall be kept screened by approved planting or fencing so as to conceal them from the view of neighboring Lots and Units, access roads and area surrounding the Property. The service yards shall be approved in advance by the Design Review Committee in accordance with any applicable provision of the Design Guidelines.

7.8 Maintenance of Property. All Lots and Units and all improvements on any Lot or Unit shall be kept and maintained by the Owner thereof in clean, safe, attractive and sightly condition and in good repair.

7.9 No Noxious or Offensive Activity. No noxious or offensive activity shall be carried on upon any Lot or Unit nor shall anything be done or placed on any Lot or Unit which is or may become a nuisance or cause significant embarrassment, disturbance or annoyance to others.

7.10 No Hazardous Activities. No activities shall be conducted on any Lot or Unit and no improvements shall be constructed on any Lot or Unit which are or might be unsafe or hazardous to any person or property. Without limiting the generality of the foregoing, no firearms shall be discharged upon the Property and no open fires shall be lighted or permitted on the Property except in a contained barbecue unit while attended and in use for cooking purposes or within a safe and well-designed interior fireplace.

7.11 No Unsightliness. No unsightliness shall be permitted upon any of the Property. Without limiting the generality of the foregoing, (a) any unsightly structures, facilities, equipment, tools, boats and vehicles other than automobiles shall be enclosed within an approved building or appropriately screened from view, except equipment and tools when in actual use for construction, maintenance or repairs; (b) no trailers, mobile homes, tractors, truck campers or trucks other than pickup trucks shall be kept or permitted to remain upon the Property; (c) no vehicle, boat or equipment shall be constructed, reconstructed, repaired or abandoned upon the Property; (d) no lumber, grass, shrub or tree clippings, plant waste, metals, bulk materials or scrap shall be kept, stored or allowed to accumulate on the Property, except in approved service yards meeting the requirements of Section 7.7 and any requirements of the Design Guidelines and the Design Review Committee; (e) refuse, garbage and trash shall be placed and kept at all times in a covered container and such container shall be kept within an enclosed structure or appropriately screened from view; (f) hanging, drying or airing of clothing or household fabrics shall not be permitted on Lots or Units if visible from buildings, Lots, Units, or areas surrounding the Property.

7.12 No Annoying Lights, Sounds or Odors. No light shall be emitted from any Lot or Unit which is unreasonably bright or causes unreasonable glare or does not comply with the Master Rules or Design Guidelines; no sound shall be emitted from any Lot or Unit which is unreasonably loud or annoying, including without limitation, speakers, horns, whistles, bells or other sounds devices, except security and fire alarm devices used exclusively to protect the Property or improvements thereon; and no odors shall be emitted from any Lot or Unit which are noxious or offensive to others.

7.13 Septic Tanks. No septic tank shall be installed until written approval by the Design Review Committee and all governmental health authorities having jurisdiction is obtained.

7.14 Master Rules. No Owner shall violate the Master Rules adopted from time to time by the Master Association or rules adopted from time to time by any Neighborhood Association. No such rules shall be established which violate the intention or provisions of this Master Declaration or which shall unreasonably restrict the use of any Lot or Unit by the Owner thereof.

7.15 Drainage. No Owner shall have the right to alter or obstruct the then normal flow of runoff water or storm drainage into, from or across any of the Lots or Units in the absence of specific approval of the Design Review Committee and the City.

7.16 Trails. No Owner shall have the right to alter or obstruct the maintenance, use or enjoyment of any Trail adjacent to any Lot or Unit.

7.17 Parking. Parking of vehicles shall be allowed only in parking areas approved by the Design Review Committee.

7.18 Protection of Vegetation. No tree of four (4) inch caliper or greater measured 3" above the natural soil line shall be removed without the prior approval of the Design Review Committee pursuant to the Design Guidelines. Vegetation shall be placed and maintained on all Lots and in the common areas of all condominium projects as provided in the Design Guidelines and the landscaping plan approved by the Design Review Committee.

7.19 Stilt Housing. No stilt housing may be constructed on any Lot.

7.20 Excavations. Except for excavations made in the exercise of reserved mining rights (see Section 5.1(i) above), no excavation shall be made on lands subject to any Plat or Development Parcel Plant without the approval of the Design Review Committee and any governmental entity with jurisdiction over such activity.

7.21 Occupancy. No Lots shall be used for human occupancy, either temporarily or permanently, until a certificate of occupancy is issued by the City of Santaquin.

ARTICLE 8

Insurance

8.1 Common Elements. The Master Association shall maintain fire and extended coverage insurance for no less than one hundred percent (100%) of the maximum insurable value of insurable improvements on the Common Elements. The insurance coverage shall name as the insured the Master Association for the benefit of the Owners. Premiums for all insurance carried by the Master Association are Common Expenses and shall be included in the Common Assessment made by the Master Association.

8.2 Fidelity Coverage. The Master Association shall maintain fidelity coverage against dishonest acts on the part of managers, trustees, employees or volunteers responsible for handling funds collected and held for the benefit of the Members. The fidelity bond or insurance must name the Master Association as the named insured and shall be written in an amount sufficient to provide protection which is in no event less than one and one-half times the Master Association's estimated annual operating expenses and total reserves. In connection with such coverage, an appropriate endorsement to the policy to cover any persons who serve without compensation shall be added if the policy would not otherwise cover volunteers.

8.3 Waiver of Subrogation. The Master Association hereby waives and releases all claims against the Board, the Owners, the Declarant, and the agents and employees of each of the foregoing, with respect to any loss covered by such insurance, whether or not caused by

negligence or of a breach of any agreement by said persons, but only to the extent that insurance proceeds are received in compensation for such loss.

8.4. Liability Insurance. The Master Association shall maintain a comprehensive policy of public liability insurance covering all of the Common Elements. Such insurance policy shall contain a "severability of interest" clause or endorsement which shall preclude the insurer from denying the claim of an Owner because of negligent acts of the Master Association or other Owners. Coverage shall have limits of liability of not less than \$2,000,000 per occurrence for personal injury and/or property damage.

8.5 Other Insurance and General. The Master Association shall also maintain Worker's Compensation Insurance as required by law and may maintain other liability insurance as it may deem desirable, insuring each Owner and the Master Association, Board and any manager, from liability in connection with the Common elements, the premiums for which are Common Expenses included in the Common Assessments made against the Owners. Such insurance policies shall have severability of interest clauses or endorsements which shall preclude the insurer from denying the claim of any Owner because of the negligent acts of the Master Association or other Owners.

ARTICLE 9

Enforcement

9.1 Remedies and Enforcement. Declarant, the Master Association, and any Owner shall have the right to enforce this Master Declaration, the Design Guidelines and the Articles and Bylaws by appropriate proceedings at law or in equity, including the right to enjoin a violation hereof or thereof; provided, however, that the Master Association shall have the exclusive right to enforce the liens and remedies provided herein with respect to the levy, collection, and enforcement of liens for Common Assessments, Specific Assessments, Overall Special Assessments, and Capital Improvement Assessments. The City shall also have the right to enforce the Design Guidelines, including the right to enjoin any violation thereof.

9.2 Attorneys Fees and Costs. Any judgment rendered in any action or proceeding to enforce this Master Declaration, the Design Guidelines, the Articles, or Bylaws shall include a sum for attorneys' fees in an amount as the court may deem reasonable, in favor of the prevailing party, as well as the amount of any delinquent payment, interest thereon, costs of collection and court costs.

9.3 Nuisance. Any act or omission resulting in a breach of this Master Declaration, the Design Guidelines, or the Articles or Bylaws is hereby declared to be and constitute a nuisance, and every remedy allowed by law or equity against a nuisance either public or private shall be applicable against every such act or omission and may be exercised by Declarant, the Master Association, or any Owner.

9.4 Cumulative Remedies. All rights, options, and remedies of Declarant, the Master Association, or any Owner for the enforcement of this Master Declaration, the Design

Guidelines, the Articles or Bylaws shall be deemed cumulative and none of such rights, options, or remedies shall be deemed exclusive.

9.5 Waiver. The failure to enforce any of the covenants contained in this Master Declaration, the Design Guidelines, the Articles, or Bylaws shall not constitute a waiver of the right to enforce the same thereafter.

9.6 Personal Covenant. To the extent the acceptance of a conveyance of a Lot or Unit creates a personal covenant between the Owner of such Lot or Unit, other Owners, or the Master Association, such personal covenant shall terminate and be of no further force or effect from and after the date such Owner ceases to be the Owner of such Lot or Unit except for the payment of moneys which came due to the Master Association during the period of such ownership.

ARTICLE 10

Mortgage Protection Clause

10.1 Mortgage Protection. Notwithstanding any and all provisions of this Master Declaration, the Articles, or the Bylaws to the contrary (and to the extent the provisions of this Article 10, conflict with other provisions of this Master Declaration, the Articles or the Bylaws, this Article 10 shall control):

(a) Each first Mortgagee of a mortgage encumbering any Lot or Unit, at the Owner's written request, is entitled to written notification from the Master Association of any default by the Mortgagor of such Lot or Unit in the performance of such Mortgagor's obligations under this Master Declaration, the Articles, or the Bylaws, which default is not cured within sixty (60) days.

(b) Each first Mortgagee of a mortgage encumbering any Lot or Unit, together with such mortgagee's successors and assigns (including a purchaser of a Lot or Unit from or through a mortgagee), which obtains title to such Lot or Unit pursuant to the remedies provided in such mortgage, or by foreclosure of such Mortgage, or by deed of lieu of foreclosure shall take title to such Lot or Unit free and clear and shall not be liable for any claims of unpaid assessments or charges against such Lot or Unit which accrued prior to the acquisition of title to such Lot or Unit by the Mortgagee.

10.2 Consent of Lender Required. Unless one hundred percent (100%) of first Mortgagees and Members hold seventy-five percent (75%) of the voting rights in the Master Association and all of the Class C Memberships have given their prior written approval, neither the Master Association nor the Owners shall:

(a) Abandon Common Elements. By act or omission seek to abandon or materially change the use of the Common Elements or any of the improvements thereon which are owned by the Master Association. The foregoing shall not prohibit or require consent to changes on the Common Elements or the ownership thereof where the Common Elements generally remain usable for their intended purposes without material impairment as contemplated

in this Master Declaration. The granting of easements for public utilities or for other public purposes, open spaces conveyances and restrictions and ski-related transactions consistent with the intended use of such property by the Master Association and actions taken pursuant to government requirements shall not be deemed a violation of this clause.

(b) Fire and Extended Coverage Insurance. Fail to maintain fire and extended coverage on insurable Common Elements property on a current replacement cost basis in an amount not less than one hundred percent (100%) of the maximum insurable value.

(c) Fire and Extended Coverage Insurance. Use hazard insurance proceeds for losses to any Common Elements for other than the repair, replacement or reconstruction of such Common Elements.

10.3 Right to Pay. First Mortgagees may jointly or singly, pay taxes or other charges which are in default and which may or have become a charge against any Common Elements property and may pay any over due premiums on hazard insurance policies, or secure making such payments shall be reimbursed immediately by the Master Association. The Master Association shall, upon request of any first Mortgagee, issue an agreement to make reimbursement in full to all first Mortgagees.

10.4 Amendment.

(a) Neither this Master Declaration nor the Articles nor Bylaws will be amended in such a manner that the rights of any Mortgagee will be materially adversely affected.

(b) Neither Article 6, this Article 10, nor the subordination of assessments in favor of mortgages provisions earlier in the Master Declaration can be amended without the consent of all first Mortgagees.

ARTICLE 11

General Provisions

11.1 Protection of Lenders. A breach of this Master Declaration or the Articles or Bylaws shall not affect or impair the lien or charge of any bona fide Mortgage made in good faith and for value on any Lot or Unit or the improvements thereon; provided, however, that any subsequent Owner of such property shall be bound by this Master Declaration, the Articles and Bylaws, whether such Owner's title was acquired by foreclosure in a trustee's sale or otherwise.

11.2 Successors and Assigns. Except as otherwise provided herein, this Master Declaration shall be binding upon and shall inure to the benefit of Declarant, the Master Association, and each Owner and their respective heirs, personal representatives, successors and assigns.

11.3 Limited Liability. Neither Declarant, the Master Association, the Board, the Design Review Committee nor any manager, officer, director, member, agent or employee of

any of the same shall be liable to any party for any injury, damage, loss, cost or expense suffered by reason of any action or for failure to act with respect to any matter if the action taken or failure to act was in good faith and without notice.

11.4 Duration of Declaration. Any provision, covenant, condition or restriction contained in this Master Declaration which is subject to the common law rule sometimes referred to as the "rule against perpetuities," shall continue and remain in full force and effect for the period of twenty years or until this Master Declaration is terminated as hereinafter provided, whichever first occurs. All other provisions, covenants, conditions and restrictions contained in this Master Declaration shall continue and remain in full force and effect until January 1, 2050, provided however, that unless at least one year prior to said time of expiration, there is recorded an instrument directing the termination of this Master Declaration, executed by the Owners of not less than ninety percent (90%) of the Lots and Units and all first Mortgagees then subject to this Master Declaration, said other provisions, covenants, conditions and restrictions shall continue automatically for an additional ten years and thereafter for successive period of ten years unless, at least one year prior to expiration of any such extended period of duration, this Master Declaration is terminated by recorded instrument directing termination signed by the Owners of not less than ninety percent (90%) of the Lots and Units and all first mortgages then subject to this Master Declaration as aforesaid.

11.5 Lease of a Lot or Unit. Any agreement for the leasing or rental of a Lot or Unit (hereinafter in this Section referred to as a "lease") shall provide that the terms of such lease shall be subject in all respects to the provisions of this Master Declaration, the Articles, the Bylaws, the Master Rules and Design Guidelines, and any applicable Neighborhood Declaration. Said lease shall further provide that any failure by the lessee thereunder to comply with the terms of the foregoing documents shall be a default under the lease. All leases shall be in writing. Any owner who shall lease the Owner's Lot or Unit shall be responsible for assuring compliance by such Owner's lessee with this Master Declaration, the Articles, the Bylaws, the Master Rules and Design Guidelines, and applicable Neighborhood Declaration. Failure by an Owner to take legal action, including the institution of proceedings in Unlawful Detainer against his lessee who is in violation within ten (10) days after receipt of written demand so to do from the Board, shall entitle the Master Association, through the Board, to take any and all such action, including the institution of proceedings in Unlawful Detainer on behalf of such Owner against the Owner's lessee. Any expenses incurred by the Master Association, including attorneys' fees and costs of suit, shall be repaid to it by such Owner. Failure by such Owner to make such repayment within ten (10) days after receipt of a written demand therefor shall entitle the Board to levy a Specific Assessment against such Owner. In the event such Specific Assessment is not paid within thirty (30) days of its due date, the Board may resort to all remedies of the Master Association for the collection thereof including those set forth in Article 3.

11.6 Use of Funds Collected by the Master Association. All funds collected by the Master Association, including assessments, reserves and contributions to the Master Association paid by Owners, if any, shall be held by the Master Association in a fiduciary capacity to be expended in their entirety for not-for-profit purposes of the Master Association in managing, maintaining, caring for, preserving and architecturally controlling the Property and for other permitted purposes as set forth in this Master Declaration. No part of said funds shall inure to

the benefit of any Member (other than as a result of the Master Association managing, maintaining, caring for, preserving and architecturally controlling the Property and other than as a result of expenditures made for other permitted purposes set forth in this Master Declaration). Contributions to the Master Association paid by Owners, if any, shall be maintained in a segregated account.

11.7 No Perimeter Fencing; Public Use of Trails. Declarant does not propose to enclose the entire perimeter of this Property with fencing and Owners and occupants of the Property are therefore hereby placed on notice of the Public Rights.

11.8 Amendment. Subject to the other provisions of this Master Declaration, including without limitation, the rights of first Mortgagees pursuant to Article 10, and subject to the prior consent of Santaquin City, this Master Declaration may be revoked or amended as follows:

(a) The Declarant may amend these CCR's at any time until 95% of the developable acreage of the Summit Ridge Project Area as set forth in the Summit Ridge Development Plan is sold. Consent of the members of the association shall not be required until the 95% level is reached.

(b) Subsequent to the sale of 95% of the developable acreage of the Summit Ridge Project Area as set forth in the Summit Ridge Development Plan, this Master Declaration and amendments thereto may be amended by affirmative vote or written consent of not less than two thirds (66 2/3%) of all Member votes and the consent of the Class C Member.

(c) An amendment or revocation which only requires the execution of an instrument by Declarant shall be effective when executed by Declarant and recorded in the office of the Utah and Juab County Recorders. An amendment which requires the affirmative vote or written consent of the Members as provided above shall be effective when executed by the President and Secretary of the Master Association who shall certify that the amendment has been so approved, and when the amendment has been recorded in the office of the Utah and Juab County Recorders.

(d) Notwithstanding the foregoing, any provision of the Articles, the Bylaws, or this Master Declaration, which expressly requires the approval of a specified percentage or specified percentages of the voting power of the Master Association or first Mortgagees for action to be taken under said provision can be amended only with the affirmative vote or written consent of not less than the same percentage or percentages of the voting power of the Master Association and/or first Mortgagees. Any amendment subject to this provision shall be effective after the specified approval has been given and that fact has been certified in a writing executed by the President and the Secretary of the Master Association.

(e) A copy of the Design Guidelines has been attached to this Master Declaration for informational purposes only. It is not intended to be incorporated by reference into, or made a part of, this Master Declaration. Therefore, the Design Guidelines may be amended without also amending this Master Declaration, and the Master Declaration may be amended without also amending the Design Guidelines. In this regard, if the Design Guidelines

are amended, then the amended version of the Design Guidelines shall be the controlling and operative Design Guidelines without any requirement that the amendment be recorded rather than the unamended version of the Design Guidelines attached to this Master Declaration.

(f) Notwithstanding the powers of amendment granted herein, no part, paragraph, or portion of this Declaration directly affecting the City can be amended, altered, changed, added upon, or deleted without the written concurrence of Santaquin City.

11.9 No Public Right or Dedication. Nothing contained in this Master Declaration shall be deemed to be a gift or dedication of all or any part of the Project or the Property to the public, or for any public use.

11.10 Constructive Notice and Acceptance. Every person who owns, occupies or acquires any right, title, estate or interest in any Lot or Unit in the Project does and shall be conclusively deemed to have consented and agreed to every limitation, restriction, easement, reservation, condition and covenant contained, referred to or incorporated herein, whether or not any reference to this Master Declaration is contained in the instrument by which such person acquired an interest in said Lot or Unit.

11.11 Notices. Any notice permitted or required to be delivered as provided herein shall be in writing and may be delivered either personally, by mail or by facsimile. If delivery is made by mail, it shall be deemed to have been delivered seventy-two (72) hours after a copy of the same has been deposited in the United States mail, postage prepaid, addressed to any person at the address given by such person to the Master Association for the purpose of service of such notice, or to the residence of such person if no mailing address has been given to the Master Association. Such address may be changed from time to time by notice in writing to the Master Association. Any notice sent by facsimile shall be deemed delivered upon receipt of a facsimile confirmation sheet; provided that all such notices shall also be sent by one of the other methods set forth hereunder within twenty-four hours of the initial facsimile delivery.

11.12 Unsegregated Real Property Taxes. Until such time as real property taxes have been segregated by the appropriate County Assessor for any portion of the Property subdivided by a Plat, the same shall be paid by the respective Owners of Lots or Units therein. In connection with such payment, the proportionate share of such tax or installment thereof for a particular Lot or Unit in such portion of the Property shall be determined by multiplying the tax or installment in question by a fraction the numerator of which is the estimated value of such Lot or Unit and all improvements thereon and the denominator of which is the total estimated value of all Lots or Units within such portion of the Property and all improvements thereon. For purposes hereof, the Board shall obtain a determination as to such estimated values from a qualified appraiser selected by it. The Master Association may levy a Specific Assessment against any Owner who fails to pay the Owner's share of any real property taxes pursuant to this Section.

11.13 Interpretation. The provisions of this Master Declaration shall be liberally construed to effectuate its purpose of creating a uniform plan for the development of the Project. The article and section headings have been inserted for convenience only, and shall not be

considered or referred to in resolving questions of interpretation and construction. Unless the context requires a contrary construction, the singular shall include the plural and the plural the singular; and the masculine, feminine and neuter shall each include the masculine, feminine and neuter. The term "person" shall refer to a person or entity. The terms "recorded and recordation" shall refer to recording as the official records of the Utah or Juab County Recorder's office.

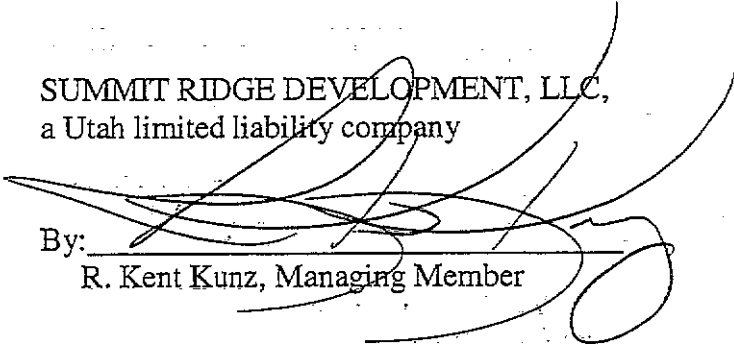
11.14 Severability. Invalidity or unenforceability of any provision of this Master Declaration in whole or in part shall not affect the validity or enforceability of any other provision of this Master Declaration.

11.15 Exemption of the City. The City and City-Owned property shall be exempt from all obligations and burdens imposed by this Declaration; provided that the City shall consult with the Design Review Committee with respect to buildings to be constructed in the Project area.. City-Owned property shall not be assessed, and any property interest dedicated or conveyed to the City shall be free and clear of any lien or encumbrance created or allowed by this Declaration.

11.16 Failure to Execute. The failure of the owner of any property described herein to execute this document shall not invalidate this Master Declaration with respect to any of the property which has been subjected to the terms and conditions set forth herein through execution of this document by its owner.

IN WITNESS WHEREOF, the parties hereto have executed this Master Declaration the day and year first above written.

SUMMIT RIDGE DEVELOPMENT, LLC,
a Utah limited liability company

By: 
R. Kent Kunz, Managing Member

APPROVED BY SANTAQUIN CITY with respect to Section 3.5.2 above:

SANTAQUIN CITY

By: *LaDue Scovill*
LaDue Scovill, Mayor

ATTEST: City Recorder

By: *Susan Farnsworth*
Susan Farnsworth, City Recorder

APPROVED AS TO FORM:

Brett B. Rich
Mitchell D. Maughan, City Attorney
Brett B. Rich

LAND OWNERS:

SOUTH COUNTY DEVELOPMENT, L.C.

By: *Walter McElroy*
Its: *Walter McElroy*

SHIRL L. EKINS FAMILY TRUST

By: *Shirl L. Ekins, Trustee*
Shirl L. Ekins, Trustee

SHIRL L. EKINS FAMILY IRREVOCABLE TRUST

By: *Lori Ann Ekins Dunn, Trustee*
Lori Ann Ekins Dunn, Trustee

STATE OF UTAH, ACTING THROUGH
THE SCHOOL AND INSTITUTIONAL
TRUST LAND ADMINISTRATION

By: David T. Terry
Its: DIRECTOR

APPOINTED AS TO FOLLOW:
JAY GERRARD
ATTORNEY GENERAL

By: [Signature]

UTAH S.H.O.P., LLC, a Utah limited liability company

By: Don Larsen
Its: Managing Member

DARYL J. KAY FAMILY TRUST

By: Darlene Kay
Darlene Kay, Trustee

By: Daryl J. Kay
Daryl J. Kay, Trustee

[Signature]
COY MORGAN

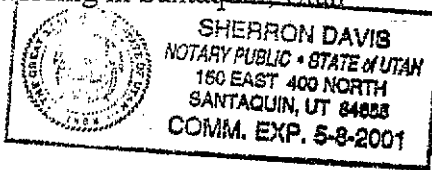
[Signature]
WILLIS H. MORGAN

STATE OF UTAH)
)
) : ss.
)
COUNTY OF UTAH)

On this 7th day of ^{Dec} ~~August~~, 2000, before me, LADUE SCOVILL, the undersigned Notary Public, personally appeared LADUE SCOVILL, personally known to me, and acknowledged he is the Mayor of Santaquin City, and further acknowledged to me that this document was executed on behalf of the City for the purposes set forth herein.

Witness my hand and official seal.

Sherron Davis
Notary Public
Residing in Santaquin, Utah

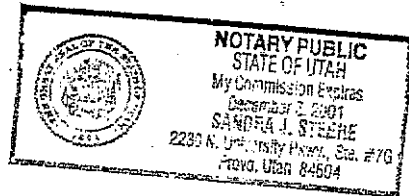


STATE OF UTAH)
)
) : ss.
)
COUNTY OF Utah)

On this 30th day of August, 2000, before me, Sandra J. Steere the undersigned Notary Public, personally appeared R. KENT KUNZ, personally known to me, and acknowledged that he is the Managing Member of SUMMIT RIDGE DEVELOPMENT, LLC, and further acknowledged that this document was executed on behalf of the limited liability company named herein for the purposes set forth herein.

Witness my hand and official seal.

Sandra J. Steere
Notary Public, State of Utah
Residing in Utah

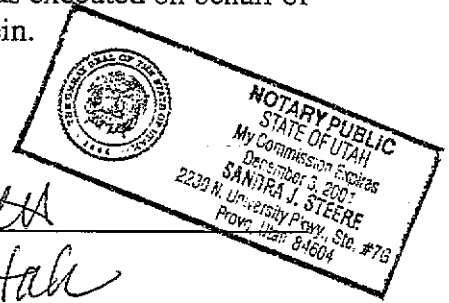


STATE OF UTAH)
)
) :ss
COUNTY OF Utah)

On this 30th day of August, 2000, before me, Sandra J. Steere, the undersigned Notary Public, personally appeared Hal M. Magleby, personally known to me, and acknowledged that he is the member manager of SOUTH COUNTY DEVELOPMENT, L.C., and further acknowledged that this document was executed on behalf of the limited liability company named herein for the purposes set forth herein.

Witness my hand and official seal.

Sandra J. Steere
Notary Public, State of Utah
Residing in Orem Utah

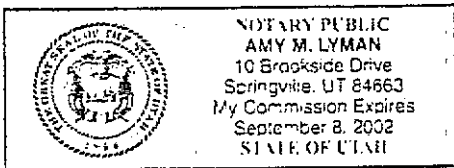


STATE OF UTAH)
)
) : ss.
COUNTY OF Utah)

On this 30th day of August, 2000, before me, Amy M. Lyman, the undersigned Notary Public, personally appeared SHIRL L. EKINS, personally known to me, who acknowledged to me that he executed this document as a Trustee of the SHIRL L. EKINS FAMILY TRUST, on behalf of the trust, and acknowledged to me that the trust executed this document for the purposes set forth herein.

Witness my hand and official seal.

Amy M. Lyman
Notary Public
Residing in Santaquin, Utah

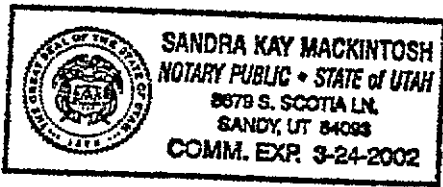


STATE OF UTAH)

COUNTY OF Salt Lake) : ss.

On this 7th day of Sept., 2000, before me, Lori Dunn, the undersigned Notary Public, personally appeared LORI ANN EKINS DUNN, personally known to me, who acknowledged to me that she executed this document as Trustee of the SHIRL L. EKINS FAMILY IRREVOCABLE TRUST, on behalf of the trust, and acknowledged to me that the trust executed this document for the purposes set forth herein.

Witness my hand and official seal.

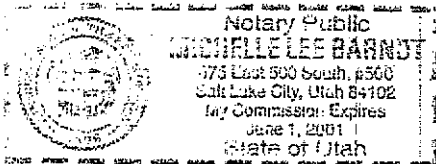


Sandra Kay Mackintosh
Notary Public
Residing in Salt Lake County, Utah

STATE OF UTAH)

COUNTY OF Salt Lake) : ss.

On this 21st day of October, 2000, before me, Michelle Barnett, the undersigned Notary Public, personally appeared David T. Terry, personally known to me to be the Director of the STATE OF UTAH, ACTING THROUGH THE SCHOOL AND INSTITUTIONAL TRUST LAND ADMINISTRATION, on behalf of the State of Utah named herein, and acknowledged to me that the State of Utah executed this document for the purposes set forth herein. Witness my hand and official seal.



Michelle Lee Barnett
Notary Public
Residing in SLC, UT

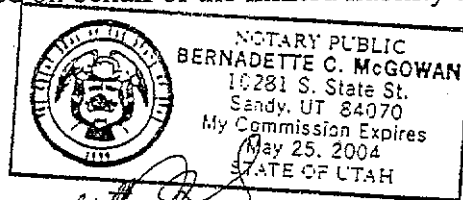
STATE OF UTAH)

:SS

COUNTY OF _____)

On this 31st day of August, 2000, before me, BERNADETTE MCGOWAN, the undersigned Notary Public, personally appeared DON LARSEN, personally known to me, and acknowledged that he is the MANAGING MEMBER of UTAH S.H.O.P., LLC, and further acknowledged that this document was executed on behalf of the limited liability company named herein for the purposes set forth herein.

Witness my hand and official seal.



Bernadette C. McGowan

Notary Public, State of Utah
Residing in UTAH

STATE OF UTAH)

:SS

COUNTY OF Utah)

On this 1st day of September, 2000, before me, George K. Waller, the undersigned Notary Public, personally appeared DARLENE KAY, personally known to me who acknowledged to me that she executed this document as Trustee of the Daryl J. Kay Family Trust for the purposes set forth herein.

Witness my hand and official seal.



George K. Waller

Notary Public
Residing in Springville, Utah

STATE OF UTAH)

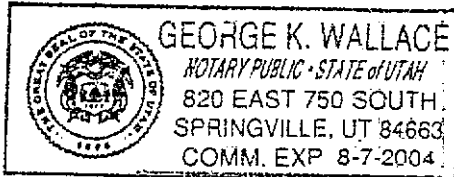
ENT 102458:2000 PG 86 of 480

COUNTY OF Utah)

: ss.

On this 1st September day of August, 2000, before me, George K. Wallace, the undersigned Notary Public, personally appeared DARYL J. KAY, personally known to me who acknowledged to me that he executed this document as Trustee of the Daryl J. Kay Family Trust for the purposes set forth herein.

Witness my hand and official seal.



George K. Wallace
Notary Public
Residing in Springville, Utah

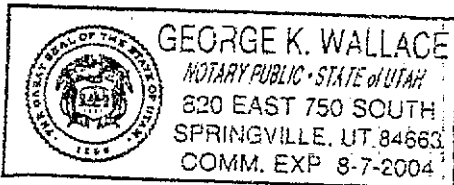
STATE OF UTAH)

: ss.

COUNTY OF Utah)

On this 31st day of August, 2000, before me, George K. Wallace, the undersigned Notary Public, personally appeared COY MORGAN, personally known to me who acknowledged to me that she executed this document for the purposes set forth herein.

Witness my hand and official seal.



George K. Wallace
Notary Public
Residing in Springville, Utah

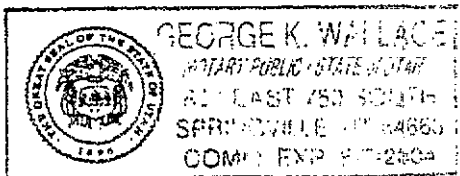
STATE OF UTAH)

: ss.

COUNTY OF Utah)

On this 31st day of August, 2000, before me, George K. Wallace, the undersigned Notary Public, personally appeared WILLIS H. MORGAN, personally known to me who acknowledged to me that he executed this document for the purposes set forth herein.

Witness my hand and official seal.



George K. Wallace
Notary Public
Residing in Springville, Utah

EXHIBIT E

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**DESIGN GUIDELINES; CULINARY AND
SECONDARY WATER PLANS; SEWER AND
STORM WATER MANAGEMENT PLANS;
PUBLIC AMENITIES PLAN AND
AFFORDABLE HOUSING PLAN**

SUMMIT RIDGE
COMMUNITY DESIGN GUIDELINES

Prepared for
Summit Ridge Master Planned Community
In
Santaquin City, Utah

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PART ONE:
GENERAL
PROVISIONS AND
DESIGN FRAMEWORK

SECTION I:
INTRODUCTION

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1.1 Purpose and Intent. The purpose of these design guidelines is to provide prospective developers and builders with a clear statement of the design philosophy, principles, and criteria for development at Summit Ridge. The intent of these guidelines is to facilitate the appropriate, coherent, and compatible uses of land in order to: (1) promote a unified community appearance that will complement the existing landscape; (2) promote a variety of different residential densities, home types, and associated lifestyles; (3) provide an attractive and functional Commerce Park; (4) provide convenient recreational amenities for both passive and active uses; and (5) promote distinct, individual neighborhood development areas and commercial and industrial areas through creative site planning, architecture, pedestrian and vehicular circulation, landscape architecture, and overall community design. Accordingly, these guidelines are established to direct development of Summit Ridge in a manner that will assure high quality design and construction. These guidelines are to be used as a tool in the development of site, architecture, and landscape architecture plans that will be submitted and reviewed by the Design Review Committee (defined below).

1.2 Project Area Description and Design Theme. Summit Ridge is located approximately 20 miles south of Provo on approximately 2,242 acres of picturesque rolling hills. The overall community is divided into several distinct development areas and is zoned for 3,222 residential dwelling units and 225 acres of commercial development. The design theme for Summit Ridge is derived from the natural landscape of Utah County. The overall community theme is intended to be strongly rooted in the heritage of the Wasatch Front and rural Utah in general. Summit Ridge will ultimately feature a wide range of housing types and commercial development at varying developmental densities.

1.3 How to Use These Guidelines. The design guidelines are divided into two parts. Part One contains General Provisions and Design Framework. Part Two contains Design Guideline Components.

1.3.1 General Provisions. This section contains information pertaining to the relationship of these design guidelines to other regulations and includes procedures for waivers, amendments, and design guideline supplements. Included in the General Provisions is a detailed procedure for design review including project orientation, conceptual planning review, final design and construction documentation. The design review procedure is intended to insure quality development in each and every project as well as the overall community. Review will include, but not necessarily be limited to, the following: site planning, architectural design, landscape architectural design, signage, circulation and grading.

1.3.2 Design Framework. The Design Framework section outlines the concepts which form the basis or foundation of the Design Guidelines. It presents an overall image or picture of the proposed physical character of Summit Ridge. This section also establishes the design principles and parameters that were used to formulate the more detailed design components found in Part Two of this document. It describes, in general terms, concepts related to natural, agrarian, and small town design themes and describes major community components such as residential neighborhoods, the Commerce Park and open space.

1.3.3 Site Planning. This section contains detailed site planning standards. They will direct development in the residential and commercial areas within Summit Ridge by outlining preferred building locations, open space areas, parking lots, circulation features, and pedestrian spaces.

1.3.4 Architecture. This section contains architectural standards related to the design and construction of residential and commercial buildings at Summit Ridge. These guidelines are intended to increase building variety and visual interest throughout the community.

1.3.5 Circulation. This section details the circulation system for Summit Ridge which will consist of parkways, arterial and community collectors, local streets and alleys, rural roadways, and off-street and street-side trails. It contains detailed cross sections designed to illustrate pavement and center median width, on-street parking type and location, width of rights-of-way, sidewalk width and location, and size and location of parkway strips. The intent of the circulation guidelines is to accommodate many forms of movement within the community at safe and manageable speeds. Ultimately, the circulation guidelines are intended to allow for livable neighborhoods and commercial areas, not just high volume, high speed passageways for cars.

1.3.6 Landscape Architecture. The intent of the landscape architectural guidelines is to promote site improvements reflective of the natural environment. This section includes conceptual design criteria for project neighborhood entry monumentation, streetscape imagery (including intersection treatments), typical single family detached front and side yard treatments, parks and open space, and edge conditions between disparate uses and along the golf course and other open spaces. It includes general landscape architectural criteria and a recommended list of plant materials.

1.3.7 Community Design Elements. Community design elements include such components as perimeter fencing, entrance monumentation, directional signage, lighting and street furniture. The guidelines controlling them are intended to provide consistency in design, materials and scale.

1.3.8 Grading. Standards are outlined here that promote site-sensitive grading practices in areas most suitable for development. They are provided with the intent of preventing the inappropriate "grading out" of environmental features.

1.4 Definitions. All capitalized terms used herein without definition shall have the meaning set forth in the Master Declaration of Covenants, Conditions and Restrictions and Reservation of Easements for Summit Ridge, recorded in the official records of the Utah County Recorder on _____ and the Juab County Recorder on _____, 2000, and any amendments thereto (the "Master Declaration"). In addition, the following definitions shall apply:

"Building Site" means any commercial building site within the Project.

"Building" means any commercial building within the Project.

"Conceptual Planning Review" is described in Section 3.3.

"Construction Document Review" is described in Section 3.5.

"Custom Home" is described in Section 6.3.2(i).

"Design Plan Review" is described in Section 3.4.

"Design Review Committee" means the Design Review Committee for the Project created pursuant to the Master Declaration.

"Developer" means Summit Ridge Development, LLC, a Utah limited liability company and its successors and assigns.

"Entry Level Home" is described in Section 6.3.2(f). ENT 102458:2000 PG 97 of 480

"Estate Home" is described in Section 6.3.2(j).

"Guidelines" means the site planning, architectural, circulation, landscape and grading guidelines set forth in these Design Guidelines. Mandatory Guidelines are indicated herein by use of the term "shall". Guidelines are indicated by the use of the term "may" or "should." To the extent these Design Guidelines conflict with permissive design guidelines of a local entity having jurisdiction over development in Summit Ridge, then these Summit Ridge Guidelines shall prevail if more restrictive. To the extent that any provisions of the Summit Ridge Design Guidelines conflict with the provisions of the Master Declaration, the Master Declaration shall control.

"Move Up Home" is described in Section 6.3.2(g).

"Occupant" means the tenant of any leased or rented property within the Project.

"Santaquin City Development Code" means the zoning and subdivision ordinances of Santaquin City.

"Semi-Custom Home" is described in Section 6.3.2(h).

"Summit Ridge Project Area" means all of the property included within the Annexation and Development Agreement for Summit Ridge (the "Development Agreement").

SECTION II: GENERAL PROVISIONS

2.1 Preface. A successful planned community depends on a variety of factors. Environmental sensitivity, market dynamics, amenities, setting, product types and price all play important roles. It has been demonstrated in many planned communities throughout the country that physical appearance is also an extremely important characteristic. Achieving a healthy and vibrant overall appearance is often the first step in promoting economic viability. An initial investment in enhancing the visual quality of a new community may bring dramatic returns. The potentials are unlimited if these design improvements are part of a coordinated effort in which buildings, open space and streetscape (including signage and lighting), are well orchestrated and planned. The goal of this section is to illustrate how these guidelines and the associated design review process promote a community vision which is unified in design and framework.

2.2 Conflict With Other Regulations. All development within the Summit Ridge Project Area shall comply with laws of the State of Utah, the United States Federal Government and the codes and regulations of Santaquin City. All development shall also comply with the Master Declaration.

2.3 Waivers. The Developer shall have the right to waive, at its sole discretion, any permissive provision of the Summit Ridge Design Guidelines as may be applied to any specific development plan. No mandatory provision may be waived except with consent of both the City and the Developer. No such waiver shall be construed or held to be a waiver of any other provision of these Design Guidelines or of the same provisions as to any other party.

2.4 Amendments and Supplements. The Developer may from time to time and at its sole discretion, amend or supplement these Design Guidelines by notice to all owners of real property in Summit Ridge who have provided notice address to the Developer and requested such notice. Any such amendment or supplement shall be applicable to all development plans which are subsequently approved by the Developer.

2.5 Approvals. Unless otherwise explicitly provided herein to the contrary, all approvals required under these Summit Ridge Design Guidelines shall be in writing and may be granted or withheld at the sole discretion of the Developer. Any approval pursuant to these guidelines does not constitute a warranty, assurance, or representation by the approving party; and the approving party acquires no responsibility by virtue of such approval.

2.6 Exemption of the City. The City shall be exempt from all requirements imposed by these Design Guidelines. This paragraph cannot be amended, altered, changed, or deleted without the written consent of the City.

SECTION III: DESIGN SUBMISSION AND REVIEW

3.1 Preface. A design review process has been established to ensure that all development within the Summit Ridge Project Area meets the requirements set forth in these Design Guidelines and the Master Declaration. The review covers site planning, architecture, landscape architecture, signage, and exterior lighting. The design review procedure is divided into four steps:

- (1) Orientation
- (2) Conceptual Planning Review
- (3) Design Plan Review
- (4) Construction Document Review

At each step, submission for review and approval is to be made to the Design Review Committee, which has the discretion to reasonably approve or disapprove based on these Design Guidelines. Approval to submit plans for each successive step in the design review process shall be issued by the Developer. It is recommended that architectural plans be formulated by a licensed architect, and that landscape architectural plans be developed by a licensed landscape architect.

3.2 Orientation. An orientation program describing site conditions, design guidelines, and the design review process will be presented by Developer to each developer, builder, architect, or development consultant. This orientation will briefly describe the overall context of Summit Ridge in the Utah County region and highlight the immediate context of the parcel of ground in question as it relates to the Summit Ridge Development Plan and existing conditions. It will also address any additional specific issues affecting the subject parcel. When a tentative project location has been identified, the proposed building program for that location shall be reviewed and approved by the Developer for compatibility with adjacent development and overall planning and community design for that particular area. The Developer reserves the right to waive or amend this review and approval process for any builder and/or developer.

3.3 Conceptual Planning Review. This review covers conceptual site planning, architecture, and landscape architecture for the project. At this stage, site planning is particularly important and should be developed to fine detail. Three (3) sets of conceptual plans are to be submitted to the Design Review Committee for review, including:

3.3.1 Site Plans and Related Information

- Site coverage data (e.g., total planning area acreage, number of dwelling units, dwelling units per acre, lot sizes, commercial area, open space acreage)
- Proposed footprints and setbacks
- Dwelling height/number of stories
- Parking lot layout, where applicable, including the location of standard, compact, and handicapped spaces, and numerical data for each type of parking
- Sidewalks, hiking/equestrian trails, bicycle lanes, and paths
- Community areas, such as courtyards, plazas, and squares
- Parks, open spaces and amenity areas
- Easements, existing and proposed
- North arrow and scale
- Driveways
- Building location
- Sign location
- Exterior lighting
- Any other information pertinent to the development
- Truck routing
- Loading docks
- Site drainage information

3.3.2 Schematic Architectural Plans.

- Floor plan(s), areas and rooms
- Names illustrating intended use of areas and rooms
- Dimensions of all areas and rooms
- Decks and plazas
- Roof plan
- Description of surface material for walks
- Elevation(s) showing heights, materials, colors, sign locations and sizes and scale.
- Exterior materials, colors, and finishes under consideration.

3.3.3 Schematic Landscape Architecture Plan

- Conceptual landscape plan showing trees (minimum of 30 foot spacing on perimeter), shrubs, groundcovers, and berms
- Conceptual fence and/or wall plan
- Plant materials under consideration
- Walkways
- Plazas or decks
- Trellis, fences
- Slope stabilization
- Grading
- Materials lists including size, quantity, and specification
- Irrigation system
- Any other pertinent information

3.4 Design Plan Review.

Design plans cover specific designs for site planning, architecture, landscape architecture, signage, and exterior lighting. The design drawings should be a progression of the approved conceptual plans. This review should include resolution of the conditions placed on the prior conceptual planning approval. Three (3) complete sets of design drawings are to be submitted to the Design Review Committee for review, including:

3.4.1 Site Plans and Related Information.

- Site coverage data (e.g., total planning area acreage, number of dwelling units, dwelling units per are, lot sizes, open space acreage)
- Dwelling height/number of stories
- Roadway width and rights-of-way
- Parking lot layout, where applicable, including the location of standard, compact, and handicapped spaces and numerical data for each type of parking
- Sidewalks, hiking/equestrian trails, bicycle lanes, and paths
- Community areas such as courtyards, plazas, and squares
- Parks, open spaces and amenity areas
- Development phasing concept
- Location and elevation of residences (and associated basements) in relation to utilities (sewer, water, gas, power, and telecommunications)
- Grading plan for each residential lot with existing and proposed grades
- Location of street lights
- Location of accessory structures, decks, driveways, etc.
- North arrow and scale

3.4.2 Architectural Design.

- Floor plan(s) (including the square footage of each residence or commercial building)
- Elevations: three (3) elevations for each floor plan with full graphic representation of exterior treatments
- Roof plan
- Section(s)
- Sample board of exterior materials (e.g., cladding, roof materials), colors and finishes for building body and trim
- Method of screening of exterior utility boxes and mechanical and communications equipment

3.4.3 Landscape Architectural Design.

- Location, size, quantity, and types of plan materials
- Location and dimensions of berms and other grading elements
- Location and type of hardscape materials
- Description of type of irrigation proposed
- Location, type and materials of fencing and/or walls

3.4.4 Signage and Mailbox Design.

- Location of proposed signs and mailboxes
- Conceptual design of proposed signs, including size, materials, colors, and illumination
- Mailbox design

3.4.5 Lighting Design.

- Location, type and color of on-site exterior lighting fixtures (both wall and ground mounted)

3.5 Construction Document Review.

This review covers all required construction documents. The objective of this review is to assure that the approved details in the design are carried into final construction drawings, and that conditions placed on the design plans are resolved. Three (3) complete sets of construction documents are to be submitted to the Design Review Committee, including:

- Final site plan and related data, including final grading, surface drainage, and utility layout
- Final architectural plans
- Final exterior finish, color and material board(s)
- Final landscape architectural and irrigation plans
- Final lighting plans, including designs and locations
- Pertinent details and specifications
- Construction schedule
- Model homes furnishings, landscaping, officing, and traffic trapping plans, if any

3.6 Compliance Verification. Construction may be monitored to verify compliance with the Summit Ridge Design Guidelines and approved construction documents.

3.7 Review Fees. Review fees to the Design Review Committee shall be paid upon commencement of Conceptual Planning Review. Design Review Committee fees shall be \$150.00 per custom residence, \$150.00 per production builder floor plan plus \$20.00 per lot in subdivisions, and \$500.00 per commercial building. If upon commencement of a subsequent review process, conditions placed in a prior review process have not been corrected, the Design Review Committee will charge an additional fee of \$150.00 per floor plan custom residence or \$500.00 per commercial building.

SECTION IV: COMMUNITY DESIGN FRAMEWORK

4.1 Design Framework. The design framework will (1) establish a community design vision, which will "drive" the physical design of Summit Ridge by developing design themes consistent with the preservation of the natural environment and heritage of "rural" and "small town" Utah County, and (2) establish design principles which support the community design vision through the use of innovative and imaginative architecture, landscape architecture and site planning techniques.

4.2 The Natural Environment Theme. Summit Ridge can be likened to a tapestry of unique natural features characterized by rolling juniper covered hills, riparian corridors, sage flats and diverse plant and animal species. Nature, rather than being vanquished or dominated, must be treated as an ally

and friend, whose ways must be understood, and whose council must be respected. Environmentally protected lands will be conserved.

4.2.1 Development shall be orchestrated to preserve elements of natural beauty so the public might participate in the natural environment with minimum damage or obstruction.

4.2.2 The existing topography of the site shall be a framework on which to design the building environment. Land use patterns shall respect and complement the form of the topography.

4.2.3 The character of the natural landscape must be incorporated into the design of the building environment whenever possible.

4.2.4 Areas which are environmentally sensitive and important to the surviving of the existing ecosystems should be protected from encroachment or inappropriate use.

4.2.5 Certain areas (e.g., steep topographic features, drainage swales) are intolerant of development and should be left in their natural state.

4.3 The Summit Ridge Concept. Summit Ridge is separated conceptually from other properties using conventional development patterns by the establishment of development areas. These individual sub-areas exhibit special characteristics which are unique in terms of physical attributes, identity, and image. Each development area is discreet, identifiable, and manageable in terms of development capacity, and is typically defined by open space elements, recreation features, and/or streetscape elements. A development team can be designed to accommodate a similar (conventional, single family detached or commercial) or deliberately diversified mix of land uses. Neighborhoods are sub-units of residential areas. Summit Ridge will be a premier master-planned community which is intended to reflect and enhance the natural, historical and built environments with a variety of housing types combined with a network of traditionally styled streets and strategically located neighborhood open spaces.

4.3.1 Overall Community Concept. Important components of the community design concept include the following:

a. Residential Neighborhoods. Residential Neighborhoods are defined as a component of individual development areas. One development area may be composed of a group of neighborhoods defined by clearly recognizable edges. Neighborhood boundaries may be defined by planted gateways and/or with walls/fencing that enhance the sense of architectural and community identity

b. Commerce Park. The Commerce Park will include industrial, retail, educational, manufacturing and other permitted commercial uses which together function as a unified business park.

c. Open Space. Open space features consist of public parks, pedestrian paths, hiking trails, equestrian paths, community and neighborhood entries, recreation centers, and "vest pocket" parks (mostly defined by adjacent streets). Many of these community open spaces will function as semi-private neighborhood focal points where residents can gather and recreate.

d. Community Roadways. Individual neighborhood development areas and a golf course may be accessed via a hierarchical road network. The landscaping along these roadways will incorporate zoned irrigation and native plant materials. These roadways are considered windows into

the community and, as such, shall be designed to provide view corridors out to the mountains and valley. These roadways shall be designed to accommodate off-street pedestrian trails.

e. Trails System. Summit ridge shall offer a variety of off-street trails providing links between residential neighborhoods and community amenities. Along the roadways, the trail system is designed to separate pedestrians, equestrians, and bicyclists from vehicular traffic through the use of pathways detached from the curb. Equestrians shall be separated from the hiker/biker trails. Residential neighborhoods will be connected to the trail network through the neighborhood parks and open spaces and through less-traveled local streets.

f. Golf Course. When constructed, the fairways will be aligned to preserve views and create internal neighborhood "islands". These islands are designed to sensitively integrate and harmonize with the natural, target style golf course. Native planted golf hazards will compliment green landing targets. The golf course will feature vast panoramic views of the surrounding mountains throughout the course.

g. Neighborhood Parks. Neighborhood parks will vary in size and in amenities. The overall intent is to create parks that are both aesthetically pleasing and functional. Active-use amenities associated with neighborhood parks may consist of recreational uses including formally laid out ball fields and grassy, "free-form" areas for informal sports and/or gatherings. Passive-use amenities may include shaded picnic areas with covered arbors, pergolas or gazebos.

h. Community and Neighborhood Entry Monumentation. Entry features are designed to welcome residents and visitors to the community, identify Summit Ridge as a special place, and promote a common design theme.

PART TWO:
DESIGN
GUIDELINE
COMPONENTS

SECTION V: SITE PLANNING GUIDELINES

5.1 Preface. The following site planning guidelines are intended as a reference to assist the designer in understanding the Developer's goals and objectives for high quality development. The guidelines complement the mandated development regulations contained in the Santaquin City Development Code by providing examples of potential design solutions and interpretations of the various mandatory regulations.

The site planning design guidelines are general in nature and may be interpreted with some flexibility in their application to specific planning areas. The guidelines will be utilized during the Developer's design review process (see Section III: Design Submission and Review) to encourage the highest level of design quality while at the same time providing the flexibility necessary to encourage creativity on the part of project designers.

The site planning guidelines are formatted into three general categories: Single-Family Residential, Multi-Family Residential and Commercial. They also include guidelines concerning signs in the Commercial Area, buffers and screening in all areas and underground utilities for the Project.

5.2 Residential Site Planning, Single Family Detached. An important goal of the single family detached site planning guidelines is to create functional and visual variety along local streets. It is the intent of these guidelines to discourage subdivisions where identical homes march down long, uninterrupted, straight streets, with no variation in building placement, building elevation or street scene. All single family detached subdivision plans shall be evaluated using the guidelines contained in this section with emphasis on the following criteria:

- Proportional mix and placement of home "products"
- Placement of the dwelling unit on the lot
- Placement and orientation of garages
- Preservation of ridgelines
- Preservation of views
- Preservation of natural features (e.g., riparian corridors, rock outcroppings)
- Treatment of drainage courses
- Treatment of walls and fences
- Setbacks

5.2.1 Varied Front Setbacks. Placement of dwellings and garages close to or back from the street creates different patterns of visible open space. The structures themselves also add enclosure, ultimately framing the streetscape.

5.2.2 Interruption of Straight Streets. On straight streets, landscaped medians, "knuckles", and/or "eyebrows" with landscaped islands shall be introduced to limit the length of straight stretches. No more than twelve homes in a row should occur without a change in the orientation of the road centerline – e.g., curve, kink or intersection.

5.2.3 Solar Orientation. Dwellings should be oriented, where possible, so that a majority of primary living spaces receive direct sunlight for the daylight hours. Dwellings should be positioned to minimize the impact of shadows on adjacent properties, to the extent possible and reasonable.

5.2.4 Varied Lot Width and Side-Yard Setbacks. Making some lots wider and some narrower than the average is encouraged. This also allows for the placement of different shapes and sizes of homes as well as variations in open space dimensions. On narrow lots, a variation of only two to four feet can make a perceptible difference.

5.2.5 Varied Garage Placement and Orientation. Lot size should permit some garages to be side-loaded from the street in order to break up the monotony of all garage doors being placed parallel to the street. Alley-accessed, rear-loaded garages, either attached to the dwelling or detached, are encouraged. Careful consideration shall be given to the location of garages and driveways at corners so that a side-load configuration does not cause conflicts with automobile traffic circulation at those corners. Placing the side-loaded garage on the interior of the corner lot is preferred. Garage setbacks shall allow driveway parking that keeps the sidewalk clear of vehicles (16 feet minimum, 20 feet preferred).

5.2.6 Cul-de-Sac Connections. Openings should be provided at the end of cul-de-sacs to provide a pedestrian connection to open space and paths/walkways.

5.2.7 Straight and Curved Streets. Straight and relatively narrow streets are most efficient for achieving densities of four or more dwelling units per acre and can be used effectively to define and project a traditional neighborhood image. They should not be longer than 10-12 lots in a row of 650 to 700 feet before the centerline of the street is interrupted. Other neighborhoods can promote a street system which responds to natural features and more rugged topographic conditions by utilizing curves.

5.3 Residential Site Planning: Multi-Family Attached. Multi-family (stacked flats) and single-family attached (town-homes), and generally, all kinds of clustered housing, because of their higher densities, tend to generate large parking areas and a decrease in private open space. If not properly designed, parking facilities can dominate the site and open spaces may be relegated to left-over areas. Residential developments surrounded by high walls, parking lots, and rows of carports along public streets should be avoided. Perimeter parking lots are especially discouraged because parking areas provide a poor image of a neighborhood and often function as barriers between the neighborhood and the surrounding community. The guidelines that follow are intended to help mitigate the effects of these situations and to provide a pleasant residential environment within the context of higher density development.

5.3.1 Building Articulation. Long, unbroken facades and box-like forms should be avoided. Building footprints and facades should be broken-up to give the appearance of a collection of smaller structures. To the extent possible, each of the units should be individually recognizable. This can be accomplished with the use of balconies, setbacks and projections, which articulate individual dwellings or collections of units, and by the pattern and rhythm of windows and doors.

5.3.2 Clustering of Units. Clustering of multi-family and single-family attached buildings should be a consistent site planning standard. Structures composed of a "cluster" of simple yet varied plans insure variety in overall building form. The following design techniques should be considered and implemented whenever possible.

- Varied front setbacks within the same structure
- Staggered and jogged unit planes within the same structure
- Use of reverse building plans to add variety
- Vary building orientations to avoid the monotony of "barracks like" site configurations

5.3.3 Project Entries. Project entry areas provide the resident and visitor with an overview to the project. They should provide an open window into the project which highlights landscaping, recreational facilities, and project directories. Special attention should be given to hardscape and landscape treatments that enhance the overall project image at entries.

5.3.4 Entry Drives. The principal vehicular access into a multi-family attached housing development should be through an entry drive rather than a parking aisle. An entry drive has no or very limited parking along it. Angled or parallel (street-side) parking is preferred. Colored, textured paving treatments at entry drives shall be encouraged.

5.3.5 On-Site Parking and Drives. In medium-high density developments, there are four means of accommodating parking: parking drives, parking courts, garages within residential buildings, and tandem parking in front of garages. Projects with either long, monotonous parking drives or large, undivided parking lots shall not be permitted. When cost considerations preclude parking within residential structures, dispersed parking courts are the desired alternative.

a. Parking Drives. Parking drives, when located on the periphery of a project, isolate the development from its surroundings. Unless existing adjacent uses are considered incompatible, perimeter parking drives should be minimized or feature parallel parking along them. This makes the drive look like a typical street in a single family detached neighborhood rather than a parking lot.

b. Visibility. Parking areas should be visible from the residential units which use them, promoting surveillance.

c. Include Garages and Driveways. Garages and driveways in front of them may both be counted when calculating the required amount of parking for multi-family attached developments.

5.3.6 Carports. Where carports and free-standing garages are utilized, they should follow the same criteria for spatial arrangement as parking courts. Carports may be incorporated into patio walls so as to define public and private open space. Incorporating carports into exterior project walls adjacent to streets is discouraged. The ends of each cluster of carports should be landscaped with trellis elements.

5.3.7 Pedestrian Access From Parking. Landscape projections (fingers) leading from parking areas to sidewalks should, whenever possible, align with major building entrances to provide pedestrian access to the building entrance from a parking court or drive. Projections that align with entrances should be at least 20 feet wide and should include a pathway as well as vertical landscape or architectural elements.

5.3.8 Open Space. Residents of multi-family attached housing developments should have safe and efficient access to useable open space, whether public or private, for recreation and social activities. The design and orientation of these areas should take advantage of available sunlight and should be sheltered from the noise and traffic of adjacent streets or other incompatible uses. Required common open space should be conveniently located for the majority of units. Private open spaces should be contiguous to the units they serve and screened from public view. Multi-family developments should have open spaces and children's play areas that are visible from the units, promoting surveillance.

5.3.9 Refuse Storage/Disposal. Trash bins should be fully enclosed by decorative masonry walls and equipped with solid metal gates. Enclosures should be softened with landscaping on

their most visible sides. Recommended locations include parking courts or at the end of parking bays. Locations should be conveniently accessible for trash collection and maintenance. Automobile access drives should not be blocked during loading operations.

5.3.10 Support Facilities. Any support structures within multi-family residential neighborhoods such as laundry facilities, recreation buildings, sales buildings or leasing centers should be consistent in architectural design and form with the rest of the development.

5.3.11 Mailboxes. Where common mailbox services are provided, they should be located close to the project entry or near recreation facilities. The architectural character of the enclosure or covering of the "gang" boxes provided by the postal service should be similar in form, materials and colors to the surrounding buildings. Mailbox locations shall be approved by the U.S. Postal Service.

5.3.12 Security. Multi-family neighborhoods should be designed to provide the maximum amount of security for residents and visitors. Parking areas should be well lit and located so as to be visible from residential units. Landscaping should be planned and maintained to provide views into open space areas.

5.4 Commercial Site Planning. The following requirements shall apply to the development and improvement of each building site and shall constitute restrictions on the property in the Commerce Park. Requirements for gasoline stations, retail other than in hotels, or other highway commercial uses shall be as governed by the ordinances, codes and building regulations of Santaquin City.

5.4.1 Required Setbacks. Setbacks shall provide sufficient space between buildings to ensure adequate light, safety and privacy for building occupants. They should also provide adequate space between buildings and streets and building and parking areas to ensure sound dampening for building occupants and create a landscaped setting. Setbacks shall be as follows:

- ❑ Frontage building setbacks abutting primary roadways 50 ft. or as governed by applicable zoning restrictions at the time that the area is platted, whichever is most restrictive.
- ❑ The minimum lot size shall be two (2) net acres except as provided in 5.4.4.
- ❑ Each lot shall abut a public street for the minimum distance of one hundred (100) ft.
- ❑ Each lot with frontage on roads other than primary roads shall have a front yard of not less than thirty five (35) feet. In addition, the portion of any building having a height greater than twenty (20) feet shall have an additional foot of front yard for every foot of building height above twenty (20) feet. There shall be no vehicular parking in the minimum front yard areas.
- ❑ Each lot shall maintain a side yard of at least thirty (30) feet. The fifteen (15) feet inside the property line shall be maintained in permanent landscaping.
- ❑ Each lot shall maintain a rear yard of at least thirty (30) feet. The fifteen (15) feet inside the property line shall be maintained in permanent landscaping.

5.4.2 Building Footprint. The building footprint in the Commerce Park shall not exceed 40% of the building lot.

5.4.3 Landscaping. All areas not devoted to buildings and parking areas, roadways and sidewalks shall be landscaped in conformance with these Design Guidelines. All landscaping shall be irrigated and maintained in a first class condition. Existing healthy trees shall be preserved where

practical. For the purpose of security, there will be no landscaping adjacent to pedestrian paths that would inhibit the safety of using those paths. A minimum of 25% of each commercial building lot shall be landscaped.

5.4.4 Lot Size. The building site size shall be two (2) acres or more except for the support areas (example: restaurant, day care, etc.) which may be smaller, or as specifically approved by the Design Review Committee.

5.4.5 Building Size. The minimum building size allowable for a principal building shall be 10,000 gross floor area excluding basement except for the support areas (example: restaurant, day care, etc.) which may be smaller, or as specifically approved by the Design Review Committee.

5.4.6 Setbacks. Subject to the approval of the Committee, underground improvements such as storage tanks or vaults may be placed within the setback areas.

5.4.7 Off-Street Parking, and Loading Areas. Off-street parking and loading areas are subject to the following:

- Off-street parking and loading shall be provided on each Building Site in at least the amount required by the applicable provisions of the Santaquin City Development Code. For specific users, the Committee may require additional off-street parking or loading areas.
- All driveways and areas for parking maneuvering, loading and unloading shall be paved with asphalt, concrete or similar materials.
- No parking shall be permitted on any street or drive or any place other than parking areas located on the Building Site. Each Owner or Occupant shall be responsible for compliance by its employees.
- Off-street loading areas shall be designated to include adequate space for ingress, egress, and maneuvering, and shall be hidden from view from the general public.

5.4.8. Screening of Service Facilities and Storage Areas. Refuse collection containers shall be located within an area enclosed within a sight-obscuring fence or wall constructed with the same exterior finish as the main building and at least one foot higher than the height of the solid waste container and shall be no closer than 50 feet to residential property with a concrete apron. Fuel and other storage tanks shall be installed underground wherever practicable or screened from public view. Such improvements shall be integrated into the Building and site plans and designed so as not to attract attention and shall be inconspicuously located. No materials, supplies or equipment shall be stored in any area on a Building Site except inside a closed Building, or behind a visual barrier which screens such areas so they are not visible from neighboring Building Sites or streets; the materials used for said screening barriers shall be metal or masonry in type and must be similar to and compatible with those materials used on the Building.

5.4.9 Exterior Lighting. All exterior and security lighting shall have underground service and shall be designed, erected, altered and maintained in accordance with plans and specifications approved in writing by the Design Review Committee to the end that lighting shall be compatible and harmonious through out the Commerce Park. For the purpose of security, there will be sufficient lighting adjacent to pedestrian areas to allow for the safe use of those areas. The lighting shall be well-designed. Soft lighting of the Building exterior will be permitted, provided that the light source is not visible and that it compliments the architecture. The lighting should not draw any unusual attention to the Building.

Parking lot, service area and roadway lighting will be provided by freestanding fixtures with cut off light sources to assure that the source is not seen from the street or adjacent parcels. Material and color of the fixtures will be evaluated in terms of their compatibility with the site architectural characteristics.

5.4.10 Fences. Fences or walls shall be allowed only with prior approval of the Design Review Committee, which shall specifically approve the location, height, material and color. No chain link fences are permitted.

5.4.11 Drainage. The Owner or developer of each Building Site shall submit to the Design Review Committee, a drainage plan certified by a licensed engineer qualified in drainage design.

5.5 Signs in Commercial Area. The location, type, size, design and material of all signs shall be approved in writing by the Design Review Committee in conformance with design standards set forth herein and in the Master Declaration, as well as conforming to all local sign ordinances. The following signs are allowed:

- Public necessity signs identifying danger or hazard on or near the premises
- On-premises business signs directing attention to the use, product, or service conducted on the premises on which sign is located
- Identification signs indicating nature of buildings or uses other than commercial or industrial
- Service signs giving information to public such as directions to parking facilities
- Other signs as may be approved by the Design Review Committee

5.5.1 Wall Signs. Only signs to be placed on a wall of a Building or on the ground may be allowed. No roof signs are permitted. Wall signs shall be fixture signs. Signs painted or having the appearance of being painted upon a wall, or signs projecting more than twelve (12) inches from a wall shall not be permitted. Wall signs shall be permitted to the maximum height of seventy-five percent of the height of the building on which they are located. Ground signs shall not exceed six (6) feet in height.

5.5.2 Location. No sign shall be located closer than fifteen (15) feet from any front property line with the exception of the Commerce Park identification signs.

5.5.3 Illumination. Signs may be self- or externally illuminated but shall not move, flash, blink, alternate, or oscillate in any way.

5.5.4 Standardize Multiple Signs. Where a Building Site is owned or occupied by more than one business entity, business identification signs must be standardized. The developer or Owner shall submit his standards for approval, including shape, background color, and size to be limited to thirty two (32) square feet per occupant. Notwithstanding the foregoing, the developer or Owner may select a predominant occupant for whom he may make separate submittal for sign approval, in which case, size, type and location of the predominant occupant sign shall conform to the requirements herein for individual signs.

5.5.5 Directory Signs. Where four or more business entities occupy the same Building, or group of Buildings on one Building Site under common ownership, up to two (2) approved, ground mounted, directory service signs will be allowed in addition to the on-premises business sign. Size of a directory sign shall be limited to an area of ten (10) square feet plus two (2) square feet for each business entity, provided however, that the total area of a directory sign shall not exceed seventy-five (75) square feet except as specifically approved by the Design Review Committee.

5.5.6 Commercial Sign Easements. Within the easement areas reserved on the plat of the Business Park, no structure or planting or other improvement shall be placed or permitted to remain which may damage or interfere with the installation, operation or maintenance of the utilities for which the easement was intended.

5.6 Buffers and Screening. Buffers and screening shall provide a visual buffer of unsightly areas in both residential and commercial developments such as storage and parking areas with due regard for the safety of people and protection of property. Whenever these Design Guidelines provide for buffers or screening, the following guidelines are applicable:

5.6.1 Fences and Walls. No fence or wall of any kind shall be constructed unless specifically approved by the Design Review Committee after review of complete plans.

5.6.2 Towers. Objects such as water towers, storage tanks, processing equipment, cooling towers, communication towers, vents and any other structures or equipment shall be architecturally compatible or effectively shielded from view from any street or the viewing public and shall be approved, in writing, by the Design Review Committee before construction or erection of said structures or equipment or other properties.

5.6.3 Height. Screening and buffers shall be of a height at least equal to that of the materials or equipment being stored.

5.6.4 Materials and Colors. Materials and colors should conform to Section 6.4.1.

5.7 Utilities. All utility lines shall be underground. No pipe, conduit, cable, line for water, gas, sewage, drainage, steam, electricity or any other energy or service shall be installed or maintained upon any lot (outside of any building) above the surface of the ground, except for the hoses, movable pipes used for irrigation or other purposes during construction or transformers. No utility lines may be run exposed on the face of any building. Group transformers with utility meters should be used where possible and screened with vegetation.

SECTION VI: ARCHITECTURE GUIDELINES

6.1 Preface. The architectural guidelines are intended to foster variation and identity within the context of building in Utah's Great Basin. The following guidelines itemize minimum standards for building components that shall be composed to complement regional architectural styles.

6.2 Architectural Style. The architectural guidelines do not prescribe selected architectural styles. The architectural styles proposed by the architects, builders and developers shall complement historic building in Utah. Acceptable architectural styles include, but are not limited to: Arts & Crafts, Colonial, National, Prairie, Shingle, Tudor and Victorian. It shall be understood that the intention of the architectural guidelines is not "letter perfect" authenticity, but to establish a recognizable vocabulary for architecture at Summit Ridge. Scale, mass, proportion, articulation and detailing shall complement the architectural style of the building.

6.3 Residential Architectural Guidelines. The builder shall explain the design idea proposed for a house and how the design intends to create a Utah house. A Utah house shall integrate contemporary building practices with recognizable historical precedents. If necessary, the final portion of the statement of intent shall itemize a list of standards and waivers for the particular design idea of the

house. The Design Review Committee shall evaluate individual houses in context with their statement of intent for clarity and execution of design ideas and adherence to the minimum standards established for Summit Ridge. The statement shall be the source of dialogue between the builder and Design Review Committee and shall address how the design of the house will fulfill the goals of the architectural design guidelines.

6.3.1 General Requirements.

a. Foundation. A maximum of eight inches of exposed concrete foundation shall be permitted on lower slopes. A maximum of 20 inches of exposed concrete foundation shall be permitted at a side elevation where grade slopes along the building. Concrete or concrete masonry units used as foundations shall be plastered and painted/colored to blend with the color palette of the home.

b. Decks. Decks shall be integral to the architecture of the building through location and column and railing details. Covered decks shall have roof forms complementary to the building. Supporting posts shall be six inches by six inches on entry level homes and move up homes and shall be eight inches by eight inches or greater on semi-custom, custom or estate homes. Exposed wood shall be painted or stained. Pre-manufactured plastic or PVC deck railings are discouraged.

c. Windows. Vertically proportioned windows shall be required. Metal windows shall be painted. Skylights shall be flat rather than bubbled.

d. Colors. Metal roof protrusions (e.g. plumbing stacks, roof ventilators) and accessories shall be painted to complement the adjacent materials. Garage door color shall complement the body color. White doors are discouraged. Plastered and painted foundations shall be colored to complement the body color. Trim color should contrast with the body color. Trim, soffit, gutter and downspout colors shall match.

e. Materials. Minimum percentages of a cladding material (stone, brick or stucco) shall not be required; however, when the primary material of the front elevation is stone, brick, or stucco, that material shall also be used on a minimum of 15% of the surface area on each side elevation, as well as on the front. Materials shall be consistently applied and harmonize with adjacent materials. Frequent changes of material shall be prohibited. Material changes shall occur at inside corners or be wrapped a minimum of two feet around a corner. Trim bands shall be consistent for all elevations.

f. Siding. Siding dimensions from the front elevation shall be consistent for all elevations. A minimum of 4 inch trim at window heads and four inch trim at window jambs and sills shall be required. A minimum of four inch trim shall be required beneath soffits at rake conditions. A minimum of four inch corner boards shall be required on both planes at all outside corners. A skirt board of eight inches (minimum) shall be required at the base of bays and in locations where the siding meets the foundation. Unarticulated four foot by eight foot butt-jointed sheets of any material shall be prohibited as a cladding material. The maximum width of siding shall be eight inches. Doors shall be trimmed to match the window and other openings.

g. Stucco. Openings at stucco elevations shall have trim at all four sides, or all openings shall have head, jamb and sill treatments to delineate the fenestration, or they shall have header or sill detail.

h. Solar Panels. Solar panels shall be integrated into the roof design and consistent with the roof slopes. Frames shall be colored to match the roof. All associated mechanical equipment shall be screened from view.

6.3.2 Additional Single Family Detached Requirements.

a. Elevations. If a plan is repeated, a minimum of three elevation schemes shall be developed, at least one of which shall be designed with porches. Each elevation of the house shall have one window per floor per elevation as a minimum requirement.

b. Roofs. Roofs shall have a minimum pitch of 5/12 or better. Semi-Custom, Custom and Estate houses shall have a slope of 6/12 or better and be approved by the Design Review Committee. Gutters shall be required on all draining roof areas. A minimum 12 inch eave overhang with boxed soffit shall be required.

c. Garages. Garage doors shall have a maximum distance of two feet from the bottom of the garage door header to the top of the garage plate. Front-loaded garage doors shall be recessed a minimum of eight inches from the face of the garage door wall. Three-car garages shall have a minimum offset of two feet at one bay. Side-loaded garages shall have a minimum combined window area of 30 square feet or more in the front elevation. Garage windows shall be compatible with the architecture of the house. Sectional garage doors with decorative panels shall be required.

d. Porches and Covered Entries. When a house has a porch, the following standards shall apply:

- A minimum porch column size of six inches by six inches with trimmed cap and base, or decorative columns proportioned to fit the façade of the house shall be required.
- It is recommended that porch sizes shall be a minimum depth of six feet and a minimum area of 80 square feet.
- Porches for recessed garage designs shall have a width no less than 20% of the front elevation.
- Porches at flush or projecting garage designs shall have a width no less than 40% of the front elevation (not including side-loaded garages).
- Railings are required.
- Exposed wood shall be painted or stained.
- Pre-manufactured plastic or PVC railings are discouraged.

e. Garage Orientation. Garage orientation shall conform to the Site Planning Guidelines.

Houses with lot frontage of 80' or less shall comply with the following standards:

- A minimum of 1/3 of the houses in any group of six (or less) adjacent lots shall be of recessed garage design set ten feet or more behind the front of the house.
- A maximum of 1/3 of the houses on any group of six (or less) adjacent lots shall be of recessed garage design set less than ten feet behind the front of the house or flush garage design.
- A maximum of 1/3 of the houses of any group of six (or less) adjacent lots shall be of projecting garage design.

- Houses with alley-loaded garage design need not meet the above requirements.

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Houses with lot frontage of more than 80' shall comply with the followings standards:

- A minimum of 50% of the houses on any group of six (or less) adjacent lots shall be of either front-loaded garage design with the garage located at the rear of the lot (set back 30 feet or more) or side-loaded garage design.
- A maximum of 25% of the houses in any group of six (or less) adjacent lots shall be of recessed garage design set ten feet or more behind the front of the house.
- A maximum of 25% of the houses on any group of six (or less) adjacent lots shall be of recessed garage design set less than ten feet behind the front of the house, flush garage design or projecting garage design.
- Houses with alley-loaded garage design need not meet the above requirements.

f. Entry Level Home Requirements. Detached garages and "casitas" (free-standing, ancillary living quarters that typically include a bedroom, bath, eating, and/or studio/office areas) shall be considered part of the minimum main living area and total square footage requirement for a home as discussed hereafter.

- Houses shall have a minimum footprint area of 900 square feet, of which 400 square feet may be garage. The minimum square footage finished living area of an entry level home shall be no less than 800 square feet.
- Roofing materials shall be of architectural grade and have a minimum warranty of 25 years.
- Aluminum siding shall be prohibited.
- Log homes and log siding shall be prohibited.
- A minimum of six inch fascia is required.

g. Move-up Home Requirements.

- Houses shall have footprint area of 1000 square feet, of which 400 square feet may be garage. The minimum square footage finish living area of a Move-Up Home shall be no less than 1200 square feet.
- Operable windows shall be of single-hung or casement design, with exceptions for window at kitchen sinks, bathtubs, and showers.
- Aluminum siding shall be prohibited.
- Vinyl siding shall be permitted.
- Roofing material shall be of architectural grade and have a minimum warranty of 30 years.
- Log homes and log siding shall be prohibited.
- A minimum of six inch fascia shall be required.

h. Semi-Custom Home Requirements.

- Houses shall have a minimum footprint area of 1600 square feet, of which 400 square feet may be garage. The minimum finished living area square footage requirement for a semi-custom home shall be no less than 1600 square feet.
- Operable windows shall be of single-hung or casement design, with exceptions for windows at kitchen sinks, bathtubs, and showers.
- Metal windows shall be prohibited.
- Aluminum and vinyl siding shall be prohibited.
- Log homes and log siding shall be prohibited.
- Roofing material shall be of architectural grade and have a minimum warranty of 30 years.
- A minimum of eight inches fascia shall be required.

i. Custom Home Requirements.

- Houses shall be designed by a licensed architect.
- Houses shall have a minimum main level living areas of 2000 square feet, of which 600 square feet may be garage. The minimum livable square footage requirement for a custom home shall be no less than 2000 square feet.
- Operable windows shall be single-hung or casement design, with exceptions for windows above kitchen sinks, bathtubs, and showers.
- Metal windows shall be prohibited.
- Aluminum and vinyl siding shall be prohibited.
- Log homes and log siding shall be prohibited.
- Roofing material shall be architectural grade and have a minimum warranty of 40 years.
- A minimum of eight inch fascia shall be required.

j. Estate Home Requirements.

- Houses shall be designed by a license architect.
- Houses shall have a minimum main level living area of 2400 square feet, of which 800 square feet may be garage. The minimum livable square footage for an estate home shall be 3000 square feet.
- Metal and vinyl windows are prohibited.
- Aluminum and vinyl siding shall be prohibited.
- Log homes and log siding shall be prohibited. Waivers to this guideline shall be subject to approval by the Design Review Committee.
- Asphalt roofing is prohibited.
- Roofing material shall have a minimum warranty of 40 years.
- A minimum of eight inch fascia is required.

6.3.3 Streetscape Requirements: The following streetscape requirements will add variety in detached single family housing:

- If a house plan is repeated, a minimum of three distinct color schemes and elevations shall be developed.

- Houses sited on three adjacent lots (on the same side of the street) or directly across the street (sharing frontage) shall have different plan or elevations.
- Houses sited on three adjacent lots (on the same side of the street) or directly across the street (sharing frontage) shall have different color schemes.
- At least one house in a builder's selection shall be two stories. This guideline may be waived by the Design Review Committee pending review of the builder's statement of architectural intent.
- Main roof ridge lines shall vary in orientation to the street (i.e., parallel or perpendicular to the street) at least once in every four adjacent lots.
- A minimum of 1/3 of the houses on any group of nine adjacent lots shall have varying roof colors.

6.3.4 Single Family Attached Requirements. Single family attached buildings, such as town homes, shall be built to be perceived as a large customized house or an articulated rowhouse.

- a. Design. All buildings shall be designed by a licensed architect.
- b. Building Massing. The buildings shall be of human scale so as not to overwhelm or dominate their surroundings.
- c. Entries. The primary entry shall be visible and accessible from the street.
- d. Garages. Garages are encouraged to have a single-story appearance at the front of the building to provide a stepped-back architectural transition for two story structures. Garage frontage shall not comprise more than 1/2 of the street elevation. Front-loading garage doors shall be recessed a minimum of eight inches from the face of the garage door wall. Sectional garage doors with decorative panels shall be required.
- e. Roofs. Hipped and gabled roof forms shall be required. Flat and mansard roofs shall be prohibited.
- f. Mechanical Equipment. Roof mounted mechanical equipment shall be prohibited. Equipment mounted to the ground shall be screened. Equipment mounted to the structure shall be architecturally screened. All architectural screening devices shall be compatible in terms of materials, color, shape, and size, and shall blend with the building design.
- g. Ancillary Structures. Ancillary buildings shall be architecturally compatible with the main structure.
- h. Minimum Area Requirement. Each dwelling shall have a minimum livable main level living area of 600 square feet. Total floor area for move-up dwellings shall not be less than 1250 square feet, nor less than 1600 square feet for semi-custom dwellings.

6.3.5 Streetscape Requirements for Attached Residential Housing.

- a. Garage. Projecting garages shall be prohibited.
- b. Porches. If a porch is present, it shall have a width no less than 30% of the front elevation.

6.3.6 Multi-Family Attached. Multi-family attached buildings (stacked flats, for sale and for rent) shall maintain architectural compatibility with the surrounding neighborhood. The design guidelines are intended to insure that the height and bulk of higher density projects do not negatively impact nearby lower density residential areas. No duplexes or four plexes shall be permitted without consent from the City.

- a. Design. All buildings shall be designed by a licensed architect.
- b. Building Massing. Unbroken planes shall not continue more than 20 feet without articulation. Large projects shall be split into groups of structures.
- c. Materials. Materials shall be durable and require low maintenance.
- d. Entries. Access points to units shall be clustered in groups of four or less; balconies and corridors that serve five or more dwellings shall be prohibited. The primary entry shall be visible and accessible from the street. Secondary and shared entries shall be plainly visible and accessible from nearby parking areas. The use of architectural elements to denote entrances shall be required.
- e. Exterior Stairs. Stairs shall be integrated with the architecture of the building. They shall not protrude outward from the plane of any particular elevation. Open-riser metal stairs shall be prohibited.
- f. Balconies and Patios. Balconies and patios shall be required to break up large wall areas.
- g. Roofs. Hipped and gabled roof forms shall be required. Flat roofs are discouraged. Mansard roofs shall be prohibited.
- h. Gutters and Downspouts. Gutters and downspouts shall be concealed unless designed as a continuous architectural feature.
- i. Mechanical Equipment. Roof-mounted mechanical equipment shall be prohibited. Equipment mounted to the ground shall be screened. Equipment mounted to the structure shall be architecturally screened. All architectural screening devices shall be compatible in terms of materials, color, shape, and size, and shall blend with the building design.
- j. Antennae and Dishes. Antennae shall be prohibited. Satellite dishes shall be prohibited on roofs. Satellite and digital dishes shall be screened.
- k. Ancillary Structures. Ancillary buildings (carports, etc.) shall be architecturally compatible with the main structure. Carports shall have hipped or gabled roof forms and consistent roof materials to the principal building. Prefabricated metal carports shall be prohibited. Front-loaded garage doors shall be recessed a minimum of eight inches from the face of the garage door wall. Carports exposed to view from the street or open space shall be built to be perceived as a walled building. Carports shall have posts or columns proportioned to the roof.

6.3.7 Streetscape Requirement for Multi-Family Attached Residential Housing. Buildings shall be easily distinguishable from one another.

6.4 Commercial Architectural Guidelines. The Commercial Architectural Guidelines shall provide orderly and aesthetically pleasing developments of high quality contemporary architecture in harmony with the environment. Innovative architectural design is also encouraged.

6.4.1 Commercial Design Requirements.

a. Height. Non office buildings will be limited to a maximum height of 45 feet to the top of parapets, stair enclosures or mechanical penthouses or screens. All sides of a building should receive appropriate design consideration.

b. Mechanical Screening. All mechanical rooms or mechanical equipment, including units on rooftops shall be screened from a line of sight from the property line. Screening must be approved by the Design Review Committee.

c. Limit on Exterior Storage. Exterior storage of waste materials is not permitted except in covered containers and must be in an area enclosed by a wall of sufficient height to visually screen any refuse from pedestrians, other building sites, or vehicular views. No exterior display of products except as specifically approved by the Design Review Committee is permitted.

d. Exterior Service Areas. Exterior service areas shall be screened by landscaping and by masonry or concrete walls or architectural fencing designed to be in character with the building design. Exterior service areas shall be screened by landscaping and by walls or fences and reviewed by the Design Review Committee.

e. Exterior Materials and Colors List. The following list is provided as a guideline for architects designing projects for the Commerce Park exterior building materials and colors should be selected from this list. Materials not listed which are compatible with the concept should be submitted to the Design Review Committee for approval:

Concrete

- Texture
- Up to 20% of all visible building surface can have a textured finish
- No exposed aggregate finishes

Masonry

- Brick
- Size - no limitations
- Texture - no limitations for blocks
- Brick smooth face
- Color - beige, tan, brown or reddish brown ranges or other approved non-earthtones
- Joints - struck flush or raked

Stone

- Type, texture, color, range and pattern as approved by the Design Review Control Committee

Wood

- Not allowed as exterior material

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Glass

- No limitations on texture or reflectivity
- Color - as approved by the Design Review Committee

Metals for Miscellaneous Uses

- Stainless Steel
- Aluminum – finish should be anodized coating of paint as approved by the Design Review Committee
- Color - as approved by the Design Review Committee
- Copper - any finish that is inherent to the material
- Brass - any finish that is inherent to the material
- Roofing materials
- Flat roofs - as required
- Sloped roofs - anodized aluminum or glass as approved by the Design Review Committee

6.4.2 Exterior Lighting Requirements. Exterior lighting shall create a functional, pleasing and coordinated relationship of lighting, sign, and plant material for aesthetics, security and safety, maintaining a compatible look throughout the Commerce Park.

- a. Plan. A lighting plan describing the exterior illumination layout and fixture selection must be approved by the Design Review Committee prior to construction.
- b. Location. Lights shall not be placed to cause glare or excessive light spillage on neighboring sites. Lights shall be sufficient for the safety of personnel and property.
- c. Parking Lot and Driveway Lighting. All parking lot and driveway lighting should provide relatively uniform illumination. Accent illumination is required at key points such as entrances, exits, loading zones, and drives.
- d. Concealed Lighting Sources. Concealed light sources are required.
- e. Security Lighting. Security light sources shall be kept in operation all night.
- f. Colored Lighting. All exterior lighting shall be colored-corrected for true white but with allowance for modest amounts of blue or green.
- g. Glare. No clear glass bulbs or globes will be used in exterior lights. To minimize glare, use frosted or opaque.

**SECTION VII:
CIRCULATION GUIDELINES**

7.1 Preface. The circulation concept for Summit Ridge is based on a hierarchy of roadways and pedestrian paths, that provide access throughout Summit Ridge and surrounding community. There will be a backbone system of community collector streets and arterial roads providing efficient access from I-15 and between the various development areas and individual neighborhoods and other areas of interest. Within individual neighborhoods, neighborhood collector streets and local streets are intended to move traffic at modest speeds. These streets conform to narrower street standards in order to calm traffic. Other street types include the entry collector, the rural road and the private street. The hierarchy of streets create order and provide a transition from transportation efficiency to calm, walkable neighborhoods. In addition to street hierarchy, sidewalks and recreation trails are also outlined below.

7.2 General Circulation Design Parameters.

- The circulation system shall respond to topography, land use, and environmental constraints. On relatively flat terrain, grid or modified grid-oriented street patterns should be employed, sympathetic to traditional neighborhood design planning patterns.
- Long straight streets shall be avoided. Narrower streets reflecting a more "human scale" shall be encouraged.
- Streets and pathways should lead directly to visual anchors and/or focal points. This is a key urban design tenet that creates a special "sense of place" and helps people orient themselves within neighborhoods.
- Direct connections shall be provided to public-oriented features eliminating intrusion of very public-oriented traffic into residential development areas.
- Circulation features shall be designed to direct individuals to entrances to and/or exists from golf courses. The entry/exit function is a critical means of defining a sequence of movement and creating a sense of "arrival" and "passage" through Summit Ridge.
- Summit Ridge Parkway shall be designed as the primary arterial road within Summit Ridge providing access to each individual enclave.
- Summit Ridge Parkway shall be designed as the primary arterial road within Summit Ridge providing access to each neighborhood.

7.3 Roadway Hierarchy. The circulation system for Summit Ridge will consist of roads and streets of various sizes, as well as recreation trails intended for pedestrians, equestrians and bicyclists. The overall intent is to accommodate many traditional and alternative forms of movement within and through the community.

7.3.1 Vehicular Circulation System. The vehicular circulation system will be hierarchical with seven general levels: (1) four lane arterials; (2) two-lane community collectors; (3) two-lane neighborhood collectors; (4) two-lane local streets; (5) two-lane rural road sections; (6) two-lane private byways in commercial areas; and (7) private residential streets. All roads and streets shall be built to a minimum paved travel width. However, special provisions will be made for commercial and private streets within the Project (note: all dimensions for roadways are to back of curb).

- Four Lane Arterials. These roadways are designed as four-lane parkways. The parkways are an efficient means of moving traffic through the development at significant speed (45 m.p.h.).
- The Summit Ridge Parkway. This four-lane parkway consists of two lanes of 14 feet for a total of 28 feet in each direction. A 24 foot landscaped center median separates two directions of travel. The right-of-way is 120 feet. It

accommodates two 34 foot deep naturally landscaped buffers or preserves that allow for 8 foot wide recreation trails.

- Two-Lane Community Collector – Class I. The primary purpose of this type of road is to collect traffic from individual neighborhoods and carry it to the arterials. The two-lane collectors are characterized by 12 foot drive lanes and two, eight foot parallel parking lanes located within a 60 foot right of way. Other features include six foot park-strips, four foot detached sidewalks within the right of way and a four foot minimum fence setback outside the right of way to allow for landscaping between the sidewalk and possible fence. Community Collectors – Class I are designed for a 25 m.p.h. posted speed limit.
- Two-Lane Community Collector – Class II. This road is similar to the two-lane Community Collector – Class I (60 foot right of way), but accommodates only one, eight foot parallel parking lane. Drive lane widths are increased to 16 feet (32 feet total), designed to accommodate greater vehicular traffic speeds up to 35 m.p.h. Other features include six foot park-strips, four foot detached sidewalks within the right of way and a four foot fence setback outside the right of way.
- Two-Lane Neighborhood Entry Collector Street. The two-lane neighborhood entry collector is designed to provide a larger park-strip area to accommodate landscape and signage features announcing entrance into individual development areas and neighborhoods. This circulation feature is characterized by two, ten foot drive lanes located within a 70 foot ROW. Other street section characteristics include two eight foot wide parallel parking lanes, 13 foot park strips, and four foot wide detached sidewalks. Neighborhood entry collectors can be posted with speed limit of 25 m.p.h.
- Two-Lane Neighborhood Collector Street. Two-lane neighborhood collector streets are intended to serve local neighborhoods within Summit Ridge. These roadways are characterized by two, ten foot drive lanes and two, eight foot parallel parking lanes located within a 60 foot right of way. Other street section characteristics include eight foot park-strips and detached four foot sidewalks. Neighborhood Collectors are designed to accommodate a speed of 20-25 m.p.h.
- Two-Lane Local Street. Local streets will comprise the largest number of streets in Summit Ridge. Two-lane local streets are intended to strictly circulate traffic within neighborhoods and will be publicly owned and maintained. The streets are characterized by two, nine foot drive lanes flanked by seven foot parking lanes, five foot park-strips and four foot detached sidewalks located within a 50 foot right of way. A four foot fence setback allows for landscaping between the sidewalk and possible fence. Local streets are designed for a 15 m.p.h. speed limit.
- Rural Road Section. Rural roads promote a “country” looking image by using historic county roadway elements that can more closely conform to the topography. These elements consist of two 12 foot drive lanes, two four foot wide gravel shoulders and a ten foot wide drainage ditch in a 42 foot right of way. Designed for speeds of 25-35 m.p.h., the rural road section will serve low density neighborhoods and link development areas and neighborhoods where traffic generation rates are not likely to be high.
- Private Residential Streets. Private residential streets may be built to a variety of standards depending on the specific need. Design standards for private streets may include the following: (1) special curb treatments; (2)

reduced pavement widths; and (3) special paving treatments, including stamped concrete or unit pavers. Private Streets shall be designed for speeds not to exceed 15 m.p.h. A typical cross section for a private street with reduced pavement should include two nine foot drive lanes and a seven foot parking lane for a total reduced pavement of 25 feet. Two parking lanes would increase the street width to 32 feet only.

- Alleys. Alleys are characterized by a minimum 15 foot wide paved section in a 20 foot right-of-way. They are to provide access to rear-loaded garages. An additional two and a half foot setback shall be provided from the edge of pavement to the garage doors and fences.

7.4 Pedestrian Circulation. Pedestrian circulation within Summit Ridge will include sidewalks and recreation trails.

7.4.1 Residential Sidewalks. Public residential roads and streets will have four foot sidewalks on both sides. To promote a sense of safety and encourage walking, sidewalks shall be separated from the automobile travel lanes by a landscaped park-strip.

7.4.2 Recreational Trails. The rugged beauty of the natural open space to be retained at Summit Ridge will be accessible to residents by a system of recreational trails for hiking, running or biking. These trails will be composed primarily of asphalt or equivalent and will be designed to reinforce the rustic character of the community. They will require a minimum of maintenance.

7.4.3 Equestrian Trails. Equestrian trails may be associated with neighborhoods that have lots greater than one acre in size. Equestrian trails will promote the rural heritage of Summit Ridge. These trails provide an alternative means of travel throughout the project as well. Equestrian trails shall be designed to a width of 12 feet. Common trails shall be surfaced with shredded bark.

7.4.4 Commercial Sidewalks. Commercial Sidewalks shall have a minimum 6' width. The builder also shall provide convenient pedestrian access from all parking areas to building entrance and provide pedestrian access from building entrances to adjacent pedestrian path systems through the Commerce Park. Large bushes adjacent to walkways should be avoided for personal safety.

7.5 Parking.

- The number of parking stall shall be consistent with Santaquin City standards.
- Layout and dimensions shall be consistent with Santaquin City standards for standard size cars.
- Landscaping shall be consistent with Santaquin City standards.
- Concrete or asphalt pads of adequate size shall be provided for motorcycle parking.
- Parking will not be permitted in any space other than paved and designated parking spaces. Each owner and occupant shall be responsible for compliance by their respective employees and visitors.
- Parking will neither be permitted on any street nor in parking setback areas.
- Visitor drop-off zones and parking should be provided near visitor entrances.
- A poured in place concrete curb shall be provided at the perimeter of planted areas within parking lots to prevent vehicular intrusion. Curbs should be continuous.
- An access driveway shall be provided and maintained between each automobile parking area and a street.
- Any ramp driveway exit rising from underground parking shall level out at a minimum of twenty (20) feet inside the property line.

- Sufficient parking space of a concrete pad type should be provided for bicycles along with adequate bicycle racks.
- All parking spaces must be designated by painted lines or other approved methods.
- Vehicle area must be sufficiently wide and free of obstacles to allow commercially available equipment to control hazardous conditions such as snow and ice buildup, fires, or other emergency requirements.

7.6 Loading and Service. These Design Guidelines provide a functional and aesthetically pleasing requirements for handling loading and service areas and vehicles as follows.

- All loading and unloading of vehicles should be conducted on each building site.
- Loading areas, loading docks, parking areas and service areas should be planned so that one use does not interfere with another.
- No loading docks or service areas shall be visible by the viewing public. Use of a landscaped buffer is required.
- Loading docks shall be so positioned that delivery vehicles will not have to use roadways as a back-up area.

SECTION VIII: LANDSCAPE ARCHITECTURE GUIDELINES

8.1 Preface. The primary objective of the landscape architecture guidelines section is to promote a pleasing and unified environment within Summit Ridge. The inspiration for the landscape concept is derived from indigenous Utah landscapes.

8.2 A Traditional Utah Great Basin Landscape. Landscape architecture for Summit Ridge will create an environment that evokes the rural Utah landscape tradition. This landscape emphasizes rustic landscape qualities. A distinct landscape zone has been created which exemplifies the essence of the Utah landscape tradition.

8.2.1 The Native Landscape. The native landscape will occur in designated open space areas. It will consist of native plant materials retained in their native condition and will be the largest landscape area within Summit Ridge. No water other than natural rainfall and snow runoff will be applied to these open space areas. Efforts shall be made to minimize disturbance of these areas from adjacent roadways and development parcels.

8.2.2 Additional Landscape. At Summit Ridge, a cultivated area landscape will be created in areas which, because of their visual prominence or intense use, are important elements in the community. These areas shall include parks, squares, commons, recreation facilities, entry gateways, and edges of major public roads. Plant material to be used in these areas may vary.

8.3 Conserving Resources. In addition to the overall idea of utilizing traditional Utah elements, the landscape concept incorporates several important ideas that are essential to the long term viability of the landscape. First, landscape development will be efficient. That is, it will concentrate resources in those areas receiving the most intense human use, such as parks and recreation facilities. Areas intended primarily for passive or visual amenity will require fewer resources. Second, landscape areas will be designed with the objective of reducing long-term water use. Maintenance standards will be directed to gradually weaning plants from watering as they mature, so that water use can be significantly reduced over the long-run. Third, the landscape will be designed to minimize long-term maintenance for the majority of landscaped areas. This will be achieved by limited areas of highly irrigated turf, clipped hedges, and ornamentals to select places where they can be emphasized.

8.4 General Landscape Architecture Principals. The landscape architecture concept for Summit Ridge is consistent with the natural and agrarian vegetation seen in the Utah Great Basin. Native plants used in groupings similar to those seen in nature will visually integrate the community into the surrounding terrain. Native grasses seen frequently in the prairies of Utah shall be used in conjunction with a limited amount of irrigated turf, which will provide green highlights. Xeriscape principals should be used through Summit Ridge to promote self-sustaining landscape zones.

8.4.1 Functional Considerations. The following should be considered by the landscape architect when preparing site designs with Summit Ridge.

- Solar orientation of exterior areas
- Separation of functional uses and creation of exterior spaces such as courtyards, squares, and plazas
- Clear identification and separation of vehicular and pedestrian traffic; maintaining required sight distances
- Reinforcement of the circulation system with plantings
- Climatic mitigation of pedestrian spaces and corridors (e.g., wind-row plantings for warming in the winter; canopy tree sun protection in the summer)
- Shelters from traffic notice and hazards
- Maximizing long-term ease of maintenance and optimizing water conservation
- Compatibility with size and type of existing planing onsite or adjacent to the site
- Utah theme featuring indigenous native plant materials
- Enriched entry areas and visitor parking
- Consideration of sculpture, public art, unique plantings, and water features
- Special lighting in public open spaces
- Use of color in the landscape

8.5 Landscape Criteria for Development Edges. Edge zones should be utilized to preserve privacy and provide for integration of Summit Ridge into the Great Basin landscape. A graduated transition into residential, commercial, and Commerce Park plantings should be made at these edges where drought tolerant and irrigated landscape zones come together.

8.5.1 Landscape Buffers Between Land Uses and at Project Boundaries. Perimeter buffers consisting of berms and plant groupings shall be used to provide a soft edge between different uses. The transition between areas should be smooth and continuous. Retaining walls, along with berms and plantings, shall be used only in buffer situations where the grade is too steep for any other solution.

8.5.2 Golf Course Edge Transition. A smooth transition shall occur between the golf course and any abutting land use. Groupings of native plants should be used for a depth of 10 to 15 feet on properties that abut the golf course. This native zone should be designed to allow native grasses to permeate the rough and create a soft edge between zones.

8.5.3 The Summit Ridge Parkway. The Summit Ridge Parkway edge plantings should reflect the preserved native hillsides. Gentle earth mounding and native plant materials should be used to transition and screen abutting neighborhoods. Native junipers shall be planted in sparsely located groves so as not to block views and to keep the natural planting concept intact.

8.6 Landscape Guidelines for Residential Neighborhoods. All residential parcels are required to have a basic landscape package installed by the Owner and/or builder. This landscape will define the edges of neighborhoods, the streetscapes within them, and become the base planting for the overall development parcel. Production builders are required to provide front yard landscapes for all Entry Level, Move-Up and Semi-Custom residences to insure a quality streetscape. Xeriscape principles, including semi-irrigated "native" turf and drop irrigation shall be utilized where practical. In single-family detached neighborhoods, a list of appropriate plant material (see Table - 1) shall be provided for the use of homeowners so they may install additional plantings that are complementary to those installed by the developer or builder in common landscaped areas. Design components established for the entire community, such as ranch and neighborhood signage, should be incorporated accordingly.

8.6.1 Residential Landscape Requirements. All residential properties shall have minimum landscape requirements. These landscape improvements are to be installed by the owner or builder within 90 days of home occupancy. If occupancy occurs during the winter months then the required landscaping shall be installed within 90 days from the start of the next growing season. The owner or builder will submit funds for proposed landscape cost plus 10% to be escrowed to the Developer's approved title company if occupancy is during the winter season.

- Landscape Plan. For Entry Level, Move-Up, and Semi-Custom residences, production builders are required to provide a front yard landscape and shall submit a typical landscape and shall submit a typical landscape plan for review (See Section III: Design Submission and Review). Said landscape plans shall be prepared by a licensed landscape architect.
- Street Trees. Each lot shall have a minimum requirement of 2 street trees per lot (minimum 2.5" caliper) to be planted along the park-strip. Any lot over 8,000 square feet shall add 1 tree per 2,000 square feet over 8,000 square feet. Corner lots shall have 3 trees unless over 8,000 square feet then add 1 tree per 2,000 square feet. Trees may be planted at a distance of less than 30' on center but not to exceed 30' on center.
- Turf. Front lawns shall have a maximum turf coverage of 80 percent. Corner lots may have up to 75 percent turf coverage. Drought tolerant turf grass species such as improved fescues or buffalo grass are strongly encouraged. Turf shall not be installed up to the foundation of the home.
- Planting Beds. Planting beds shall be 50 percent covered by plant material at the time of installation. After three years plants shall cover 75 percent of the planting beds. Seasonal flowers shall qualify as cover. Planting beds shall include the two feet adjacent to the foundation of each home.
- Additional Trees. Lots greater than 20,000 square feet shall have one (1) tree in addition to the required street trees. It is highly recommended that this tree be an evergreen.
- Mulch. No marble chips, volcanic rock, or high contrast stone pattern (e.g., black, white, red) shall be used. Open areas not covered with plants shall be covered with wood or rock mulch.
- Corner Lot Plantings. Corner lot sightlines shall not have any plant material exceeding 30 inches in height at mature growth.
- Plants. The Developer, builder, or homeowner shall select plant materials from the approved plant list (see Table II).
- Irrigation Systems. Irrigation systems for lawns and beds shall be required.
- Soil Amendments. The addition of soil amendments to existing soil is required. A typical specification for soil amendments includes three (3) cubic yards of amendment per 1,000 square feet area. Builders and owners should contact local

nurseries for specific recommendations. A site specific horticulture solids test can also provide specific soils information.

8.7 Landscape Guidelines for Commercial Areas. Landscape design for commercial areas will create a compatible and continuous relationship between site landscape areas and adjacent lots, maintain a pleasant appearance in all areas not covered by building or parking; and enhance the existing character of the site. The Owner or developer of each Building Site shall submit to the Design Review Committee a landscape plan prepared by a landscape planner showing a functional and aesthetically suitable landscaping on its Building Site. Such landscaping shall be subject to the following requirements and shall be installed in the following areas on or adjacent to the Building Site(s) only after plans therefore have been submitted to and approved by the Design Review Committee.

- Landscaping shall be required on each Building Site in setback areas that are not otherwise used for automobile parking.
- In addition to the required Landscaping of setback areas, any unpaved areas lying within adjacent street rights of way shall be landscaped and maintained to the finished curb of the Street by the Owner or Occupant of the adjacent property.
- Approved landscaping as required in this section shall be installed within three (3) months of issuance of a certificate of occupancy for the building, weather permitting. If Owner or Occupant fails to undertake or complete required landscaping prior to the end of the prescribed three (3) month period, the committee may take remedial steps as provided in the Master Declaration.

8.7.1 Commercial Landscape Requirements. The landscape plan shall further follow the following guidelines:

a. Plants. Plants shall be provided from the recommended list in Table I or as approved by the Design Review Committee.

b. Berms and Retaining Wall. All parking areas which front on a street shall be screened by a landscaped berm of a minimum, height of 3'-0" as measured from the adjacent parking lot surface. Retaining walls must be used on the parking area side of the berms where berms are less than 20 feet in width. Berm slopes must not exceed 2:1 with a minimum three feet wide flat crown. Retaining walls should be consistent in materials and design.

c. Topsoil. Topsoil shall be used on the entire landscaped area to such depth as is needed to insure healthy plantings.

d. Soil Preparation. All landscape areas to be irrigated shall receive soil preparation as directed by a professional landscaper.

e. Grasses. Unless otherwise approved by the Design Review Committee. All turf areas shall be seeded and hydro-mulched using an approved grass seed mix or sodded.

f. Irrigation Systems. All irrigation systems shall be of commercial quality, fully automatic, below ground, provide 100% coverage. Control devices shall be screened from view.

g. Lawn. All landscaping adjacent to streets and the front sixty (60) feet of all side yard landscaping (as measured from the property line adjacent to the street) shall be a lawn, interspersed with suitable plantings.

h. Plant Quality. Plant materials shall be uniform in shape, in healthy condition and well adapted to the Utah Valley area climate zones. Plantings with invasive roots shall be used.

i. Plant Variety. There should be an interesting variety of plant materials used in the landscaping plan. The landscaping plan shall consider size of plant material at maturity, not at purchase. Thorny plants shall not be placed next to pedestrian areas. Landscape material shall be of long-lived varieties. Plants and other landscape elements shall be permanent in nature. Short-lived materials, such as annual flowers, may be used to accent or supplement the basic permanent landscape plan.

j. Screening. Landscaping for screening purposes shall be selected from fast growing varieties. Plants shall be planted close enough to provide the desired screening effect in no more than two (2) years.

SECTION IX: COMMUNITY DESIGN ELEMENTS

9.1 Preface. The Community Design Elements section establishes a framework for consistency of design between the various development areas. A palette of image enhancement features which include entry gateway monumentation, neighborhood identification, wall/fencing, lighting and signage has been established.

9.2 Project Entry Monumentation.

9.2.1 Community Entrance Monumentation. There shall be a community entrance monument located at the Summit Ridge Parkway at I-15 Intersection. That monumentation shall be located at the intersection to announce entrance into the entire community of Summit Ridge. The entry monumentation will have a landscape feature and a water element.

9.2.2 Development Area Entrance Monumentation. Entrance monumentation shall also be located where major circulation features such as Summit Ridge Parkway intersect with community collectors. Such monumentation will be a scaled-down version of the community entrance monuments. Like the community entrance monuments, such monuments may contain cascading water elements.

9.2.3 Neighborhood Entrance Markers. Individual neighborhoods located within development areas will be identified through the use of small, neighborhood markers. In keeping with the natural indigenous theme which characterizes Summit Ridge, the neighborhood entrance markers will be composed of stone, brick or other material acceptable to the Design Review Committee containing the name of individual developments and/or logo inset within the monument.

9.2.4 Project Entries Objectives.

- Entries to Summit Ridge shall be special accent points that set the theme and character of the community.
- The scale, form, color, typeface, and materials of signage shall be consistent and keep with the character of the community.
- Whenever possible, directional signs shall be designed in such a manner as to provide information in a symbolic versus verbal format.

- All entry monumentation signage shall conform to the prototypes contained in this section.

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9.3 Directional and Information Signage.

9.3.1 Street Signs. Street signs shall be constructed out of 4 x 4 wood posts. Sign blades shall be encased in metal trim. All wood elements shall be stained or painted. All street signs shall meet the requirements of the City.

9.3.2 Directional Signs. All directional signs shall be mounted on 4 x 4 wood posts, and signs shall be encased in wood or metal trim. All directional signs must be approved by the Design Review Committee and shall meet the requirements of the City

9.3.3 Yard Signs. Yard signs can be no higher than three feet and no larger in size than 6 square feet (2x3) and must be approved by the Design Review Committee.

9.4 Fencing. Fencing associated with Summit Ridge shall consist of four types: perimeter fencing, interior privacy fencing, golf course/ residential boundary fencing, and open space fencing. Perimeter, golf course and open space fencing shall be constructed by individual developers and builders whose projects abut common open space features, parks, recreation amenities, and major streets. This fencing and its locations will be shown on the landscape plan for each neighborhood. Interior lot line fencing shall be installed by individual homeowners and/or builders. All fencing shall be constructed with dimensional cedarwood and stained as per owner's recommendation.

9.4.1 Perimeter and Transitional Fencing. Perimeter fencing at Summit Ridge shall consist of a six-foot high (maximum) wood fence. It shall occur where the development edges are adjacent to the Summit Ridge Parkway and community collectors streets. The fence shall be stained with a stain selected from the suggested color palette. The perimeter fencing shall terminate at corners with a six-by-six inch wood post. Where the perimeter fence meets an open space fence, then it shall transition down in height to 40" (+/-).

9.4.2 Interior Privacy Fencing. Interior privacy fencing shall consist of six-foot high (maximum) solid decorative fencing designed to provide privacy between individual lots. This fence shall be utilized along rear and side property lines on lots measuring less than 12,000 square feet, terminating a minimum 6' back from the part of the front elevation furthest back from the street. No chain link fencing of any kind is to be used.

9.4.3 Open Space Fencing – Two Rail. Open space fencing shall occur contiguous to equestrian trails, along golf course boundaries, and between open space and yards. The fence shall consist of four foot high (maximum) two rail fencing. Open space fencing shall terminate at corners with a six-by-six inch wood post.

9.4.4 Golf Course/Residential Boundary Fencing. A fence will be installed along all boundary areas between the golf course and residential lots.

9.5 Lighting. Lighting for Summit Ridge shall be designed to adequately illuminate and provide for the safety of vehicular and pedestrian movements. Lighting shall be designed to complement and harmonize with the Summit Ridge natural environment.

9.5.1 Residential Light Fixtures. Street lights shall be placed at major intersections including, but not limited to community entrances, neighborhood entrances, intersections along the

Summit Ridge Parkway with collectors, and other key locations such as parks and trail heads. Lighting shall be installed by the Developer or builder. All residential lighting shall be high pressure sodium or incandescent which falls within the warm white-to-yellow spectrum of light color. Overall height of light poles shall not exceed 15 feet.

9.6 Street Furniture. Street furniture, including benches, trash receptacles, bike racks and mail boxes shall be designed in a consistent fashion, so as to provide continuity throughout the Summit Ridge Project Area. All street furniture and accessories shall be constructed of high quality durable materials and installed by the Developer.

9.7 Mailboxes. Mailboxes for the Project shall be governed by the following guidelines:

9.7.1 Mailboxes – Multi Family. Mail delivery in the multi-family neighborhoods of Summit Ridge shall be made to grouped mail box units supplied by the U.S. Postal service. No individual mail boxes shall be permitted in multi-family neighborhoods. Clustering of mail box units is encouraged and placement should be sensitive in order to minimize the impacts to automobile circulation and the overall streetscape. Mailbox shelters are encouraged and shall be construed to harmonize with the “town and country” character of Summit Ridge in terms of materials (e.g., stone, timber) and color.

9.7.2 Mailboxes – Single Family. In general, mailboxes for single family residences shall consist of either a single box or two boxes grouped together, subject to a design review by the Design Review Committee. Individual neighborhoods are allowed only one style per neighborhood. Grouped mailboxes that accommodate a maximum of nine mail slots shall be considered. All single-family residence mailboxes must be U.S. Postal Service approved.

9.7.3 Mailboxes – Commercial. Commercial mail delivery shall be arranged between the commercial occupant and the U.S. Postal Service. Any mailbox system to be used in the Commerce Park shall be approved by the Design Review Committee.

SECTION X: SUMMIT RIDGE PROJECT AREA GRADING GUIDELINES

10.1 Preface. The grading guidelines will establish compatible relationship between buildings, parking and adjacent properties and provide alternative grading standards. Each site within Summit Ridge represents a specific set of conditions that should influence the grading design applied. A grading concept that would be ideal for one site might be totally inappropriate for another. Most of the design concepts are based on the creation of more natural appearing land forms and controlling drainage and erosion. In nature, forms, textures, and colors are not rigid or uniform. Natural forms are varied, curved, and generally irregular.

10.2 Grading Guidelines. Excessive grading should not be necessary in Summit Ridge and is not desirable. Grading should produce graceful contours, not sharp angles, and should respect the natural land forms. Contoured swales and berms will soften the impact of structures on each lot. Varying the degree of long slopes will avoid the unnatural look of broad flat surfaces. The following are general grading guidelines:

- All manufactured slopes shall be rounded to conform with the existing topography.
- Grading shall be minimized and buildings and roadways are to conform to and “bend” with landforms.
- Variation and undulation of slopes to retain the natural character of Summit Ridge shall be encouraged.

- All graded slopes shall be planted with a combination of native grasses, groundcovers, shrubs, and trees to insure slope stability, reduce erosion potential and improve visual quality. Low growing plant materials reinforce ridge slope forms. Plant materials of varying form and density should be used to soften slope banks.
- Borrow ditches should not be paved with asphaltic concrete or concrete. Borrow ditches should be seeded and accented with native rocks to naturalize a man-made ditch.
- Finished floor heights in relation to any adjacent curb in multi-family and commercial areas should be limited to a 5% differential to minimize excess handicap ramps.

10.3 Grading Requirements.

10.3.1 Approval. A site plan indicating proposed grading and drainage must be approved by the Design Review Committee before any construction is initiated.

10.3.2 Incorporated into Design. Any grades, berms, channels, and swales; should be an integral part of the grading and paved surface design.

10.3.3 Drainage Study. The developer must provide a site drainage study by a registered professional engineer licensed in the State of Utah as a condition to approval.

10.4 Erosion Prevention During Construction. Erosion must be prevented during construction in order to prevent loss of soil by water and wind erosion and prevent dust nuisance to adjacent properties.

10.4.1 Principals. Practical combinations of the following technical principals should be used to provide effective erosion control.

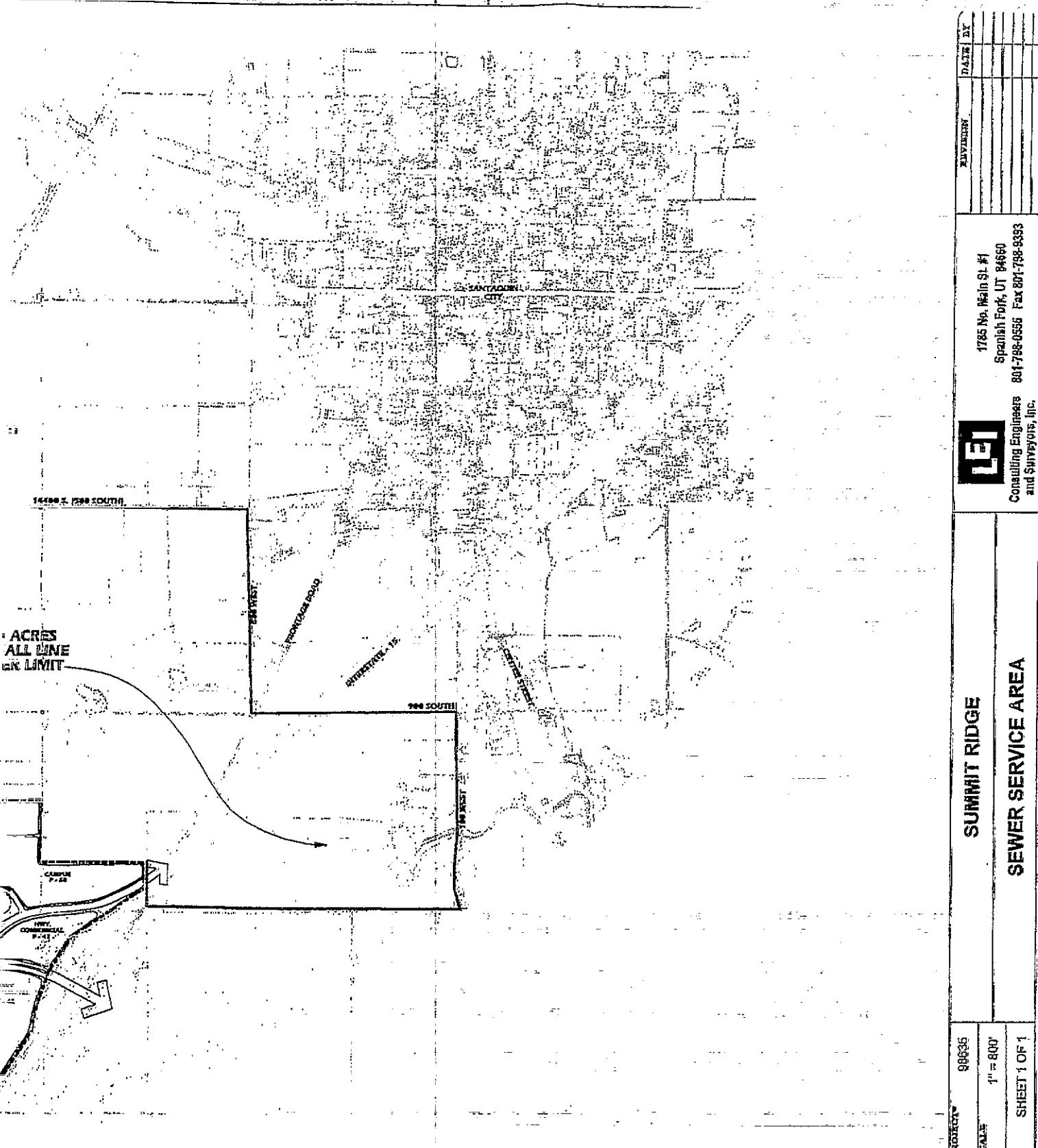
- The smallest practical area of cleared land should be exposed during construction.
- Provisions should be made to effectively accommodate the increased runoff caused by changed soil and surface conditions during and after development of construction.
- The permanent landscaping should be installed as soon as practicable during construction activities.
- Temporary mulching should be used for imported fill subject to erosion during construction projects.
- The soil should be watered down at frequent intervals in all areas creating excessive dust.

TABLE I

SUMMIT RIDGE PLANT LIST


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DESCRIPTION	COLLECTOR STREET TREES	NEIGHBORHOOD STREET TYPES (One Tree Type Per Neighborhood)
Park; Formalized Neighborhoods	Patmore Green Ash (<i>Fraxinus pennsylvanica</i> 'Patmore') Lond Plane Tree (<i>Platanus x acerifolia</i>)	Red Flame Fairview Maple (<i>Acer rubrum</i> 'Fairview Flame') Greenspire Linden (<i>Tilia cordata</i> 'Greenspire') Lond Plane Tree (<i>Platanus x acerifolia</i>)
Golf course/Large Acre/Formal/Semi-formal	Lanceleaf Cottonwood (<i>Populus acuminata</i>)* Swamp White Oak (<i>Quercus bicolor</i>)	Marshal Seedless Ash (<i>Fraxinus americana</i> 'Autumn Purple') Lanceleaf Cottonwood (<i>Populus acuminata</i>)* Red Sunset Maple (<i>Acer rubrum</i> 'Red Sunset')
Naturalized/Large Lots	Silver Maple (<i>Acer saccharinum</i>) Prairie Pride Hackberry (<i>Celtis occidentalis</i> 'Purple Pride')	Sioux Land Poplar* Honey Locust Skyline (<i>Gleditsia triacanthos</i> 'Skyline') Red Maple Fairview (<i>Acer rubrum</i> 'Fairview Flame')
Medium Density	Honey Locust Skyline (<i>Gleditsia triacanthos</i> 'Skyline') Cimmzam Ash (<i>Fraxinum americana</i> 'Cimmzam')	Honey Locust Skyline (<i>Gleditsia triacanthos</i> 'Skyline') Marshal Seedless Ash (<i>Fraxinus americana</i> 'Autumn Purple') Sugar Maple (<i>Acer saccharum</i>)
Naturalized/Large Lots	Robust Poplar (<i>Populus robusta</i>)* Silver Maple (<i>Acer saccharinum</i>)	Cimmzam Ash (<i>Fraxinum americana</i> 'Cimmzam') Narrow Leaf Cottonwood (<i>Populus angustifolia</i>) Sioux Land Poplar*
Flat Plains/Medium to High Density	Bur Oak (<i>Quercus macrocarpa</i>) Cimmzam Ash (<i>Fraxinum americana</i> 'Cimmzam')	Armstrong Maple (<i>Acer x freemanii</i> 'Armstrong') Lanceleaf cottonwood (<i>Populus acuminata</i>)* 'Bloodgood London Plane Tree' (<i>Platanus x acerifolia</i>)
Surrounded by natural hill tops	Idaho Locust Purple Robe (<i>Robinia pseudocacacia</i> 'Purple Robe') Swampe White Oak (<i>Quercus bicolor</i>)	Prairie Pride Hackberry (<i>Celtis occidentalis</i> 'Purple Price') Honey Locus Skyline (<i>Geditsia triacanthos</i> 'Skyline') Narrow Leaf Cottonwood (<i>Populus angustifolia</i>)*



ACRES
ALL LINE
OR LIMIT

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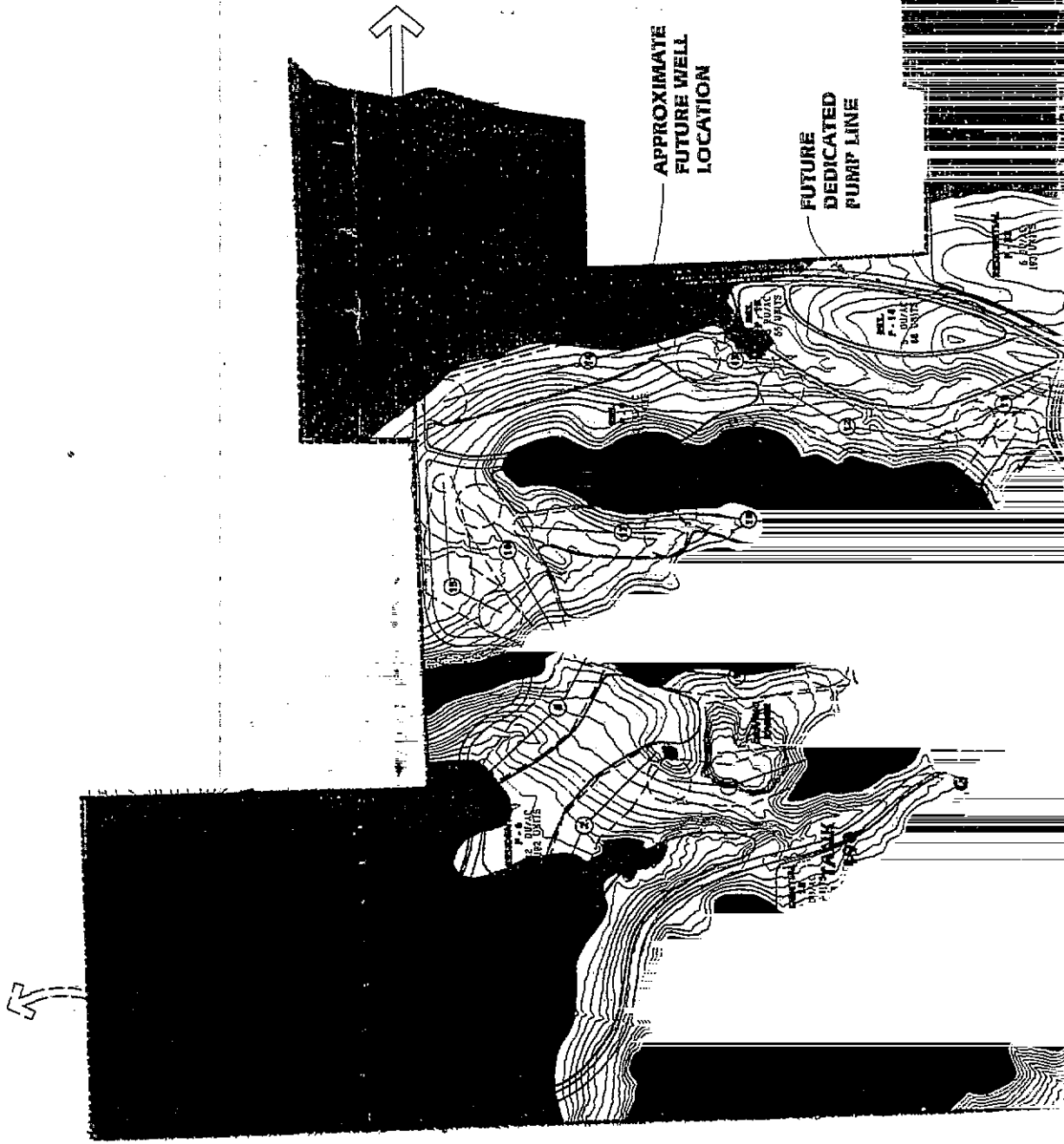
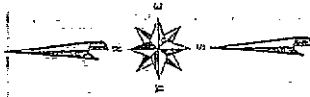
 Consulting Engineers and Surveyors, Inc.	1785 No. Main St. #1 Spanish Fork, UT 84660 801-798-0556 Fax 801-798-9393		REVISION	DATE BY
	SUMMIT RIDGE SEWER SERVICE AREA		PROJECT NO. 99836	SHEET 1 OF 1
PREPARED BY GDM / BTG	DATE 5/23/00	SCALE 1" = 800'	DRAWN BY TAS	DATE BY
PAGE 1				DATE BY

SUMMIT RIDGE CULINARY WATER

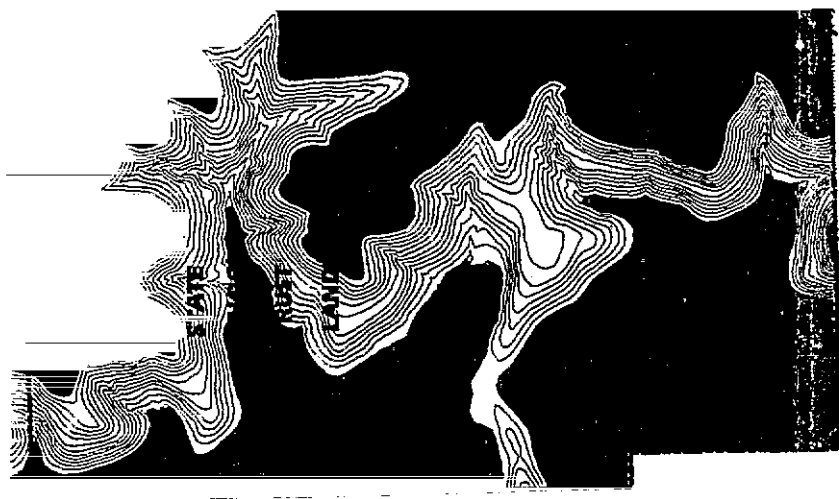
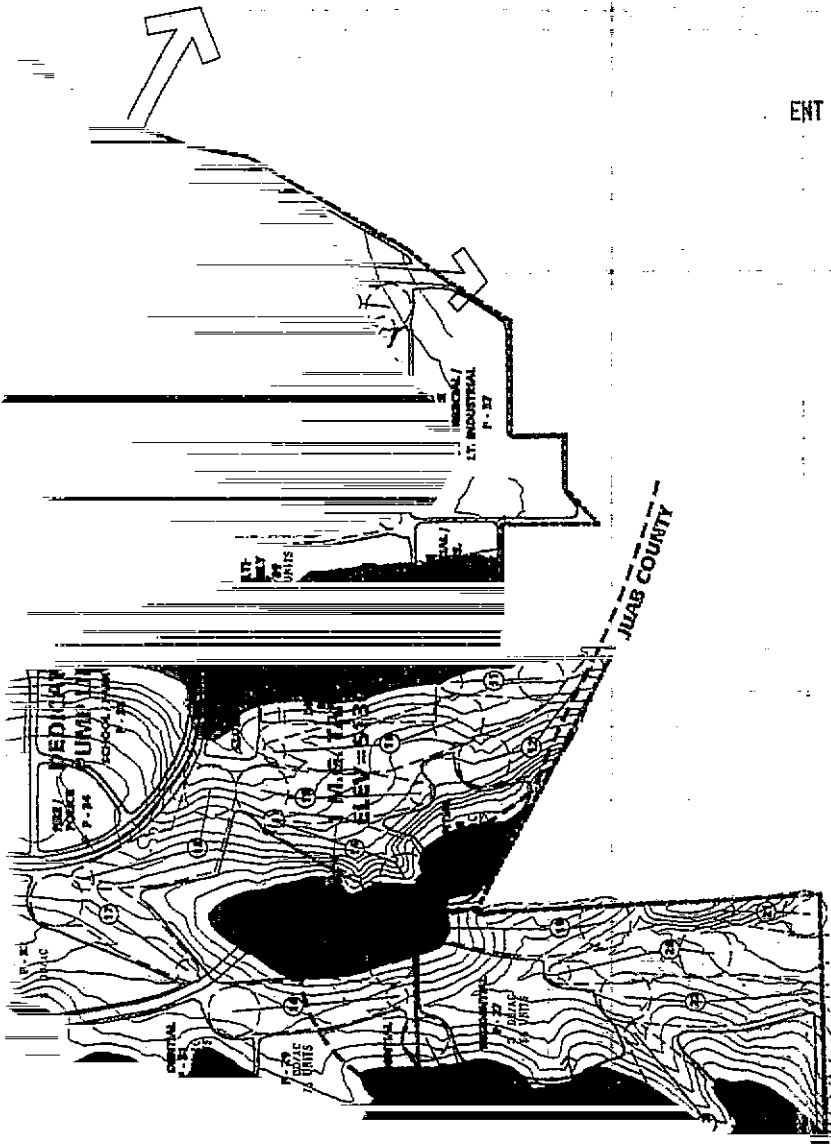
PRESSURE ZONES LEGEND

COLOR	ELEVATION	ZONE	P.S.I.	NO SERVICE
[Solid Black]	5,300 -	NO SERVICE	NO SERVICE	
[Stippled]	5,100 TO 5,300	ZONE I	40 TO 110	
[Cross-hatched]	5,000 TO 5,100	ZONE II	40 TO 100	
[Dotted]	4,900 TO 5,000	ZONE III	40 TO 100	
[White]	4,800 -	ZONE IV	40 -	

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 Consulting Engineers
 and Surveyors, Inc.
 1785 No. Main St. #1
 Spanish Fork, UT 84660
 801-798-0555 Fax 801-798-9393

SUMMIT RIDGE
CULINARY WATER

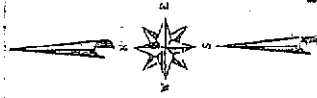
DESIGNER	GDM / BTG	PROJECT	98635
DATE	5/17/00	SCALE	1" = 600'
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SUMMIT RIDGE SECONDARY WATER

PRESSURE ZONES LEGEND

COLOR	ELEVATION	ZONE	F.S.I.
[Solid Black]	5,160	NO SERVICE	NO SERVICE
[Dotted]	5,000 TO 5,160	ZONE I	40 TO 110
[Cross-hatched]	4,850 TO 5,000	ZONE II	50 TO 110
[White]	0 TO 4,850	ZONE III	50

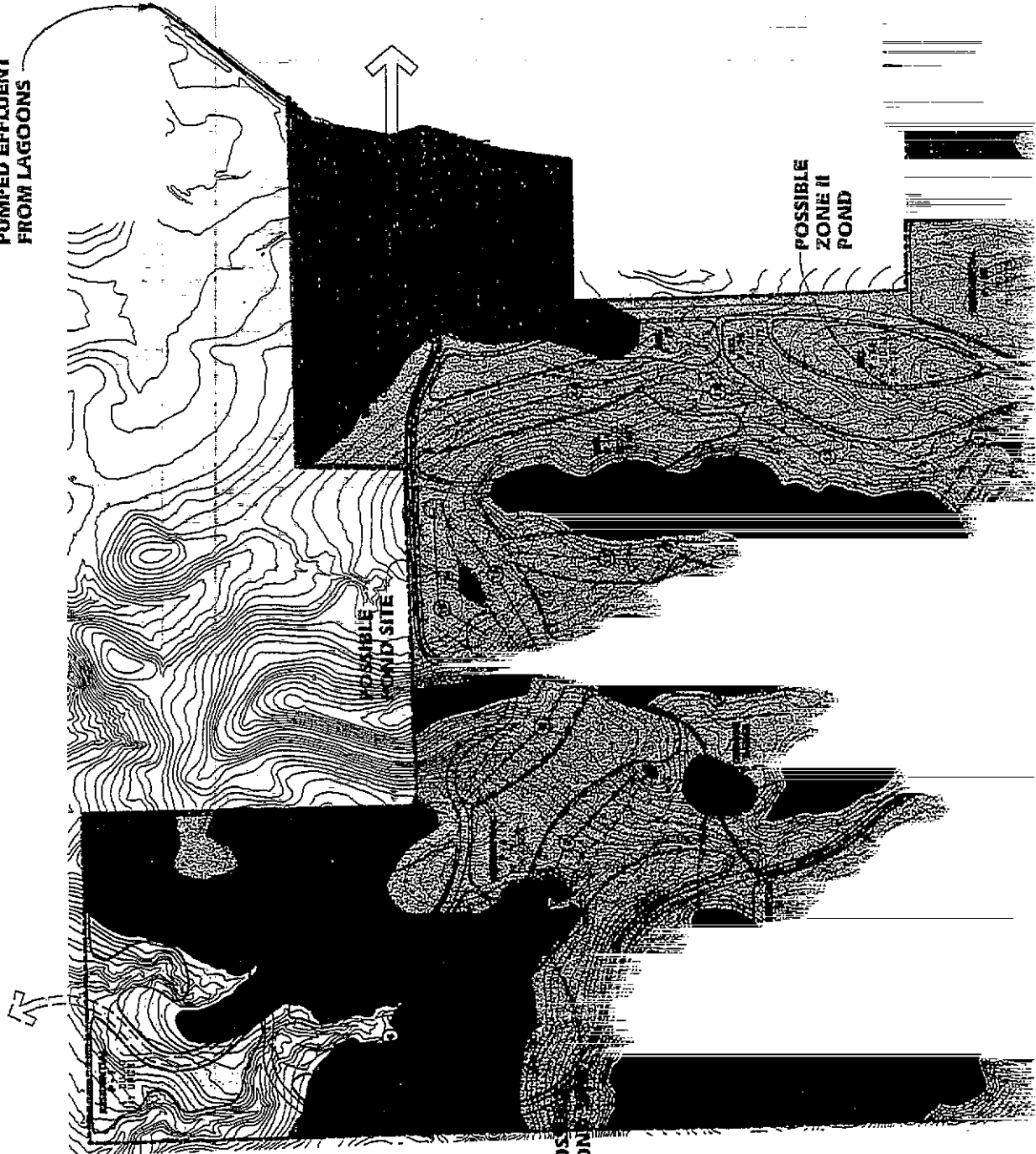
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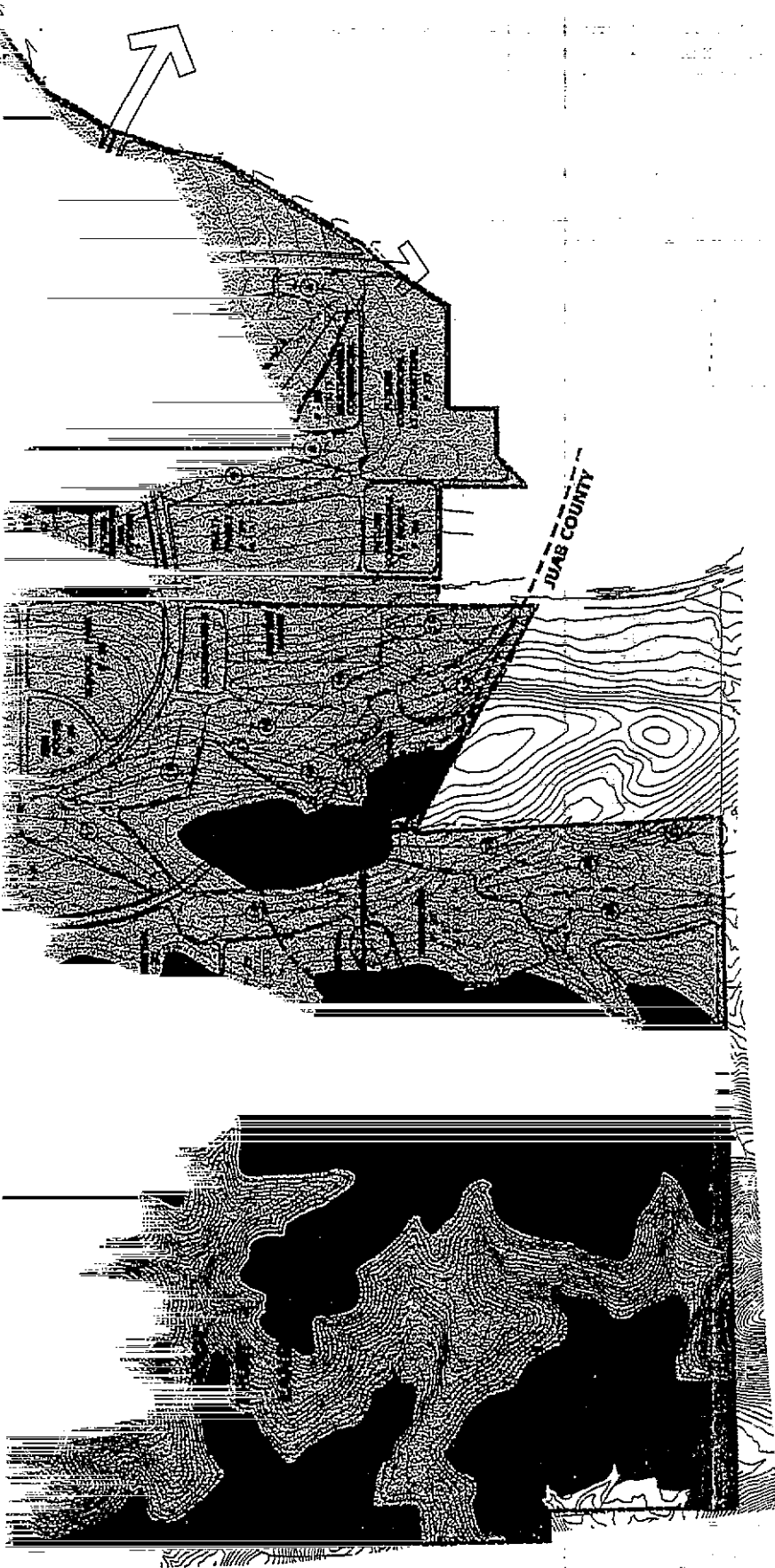
PUMPED EFFLUENT
FROM LAGOONS

POSSIBLE
ZONE II
POND

POSSIBLE
POND SITE



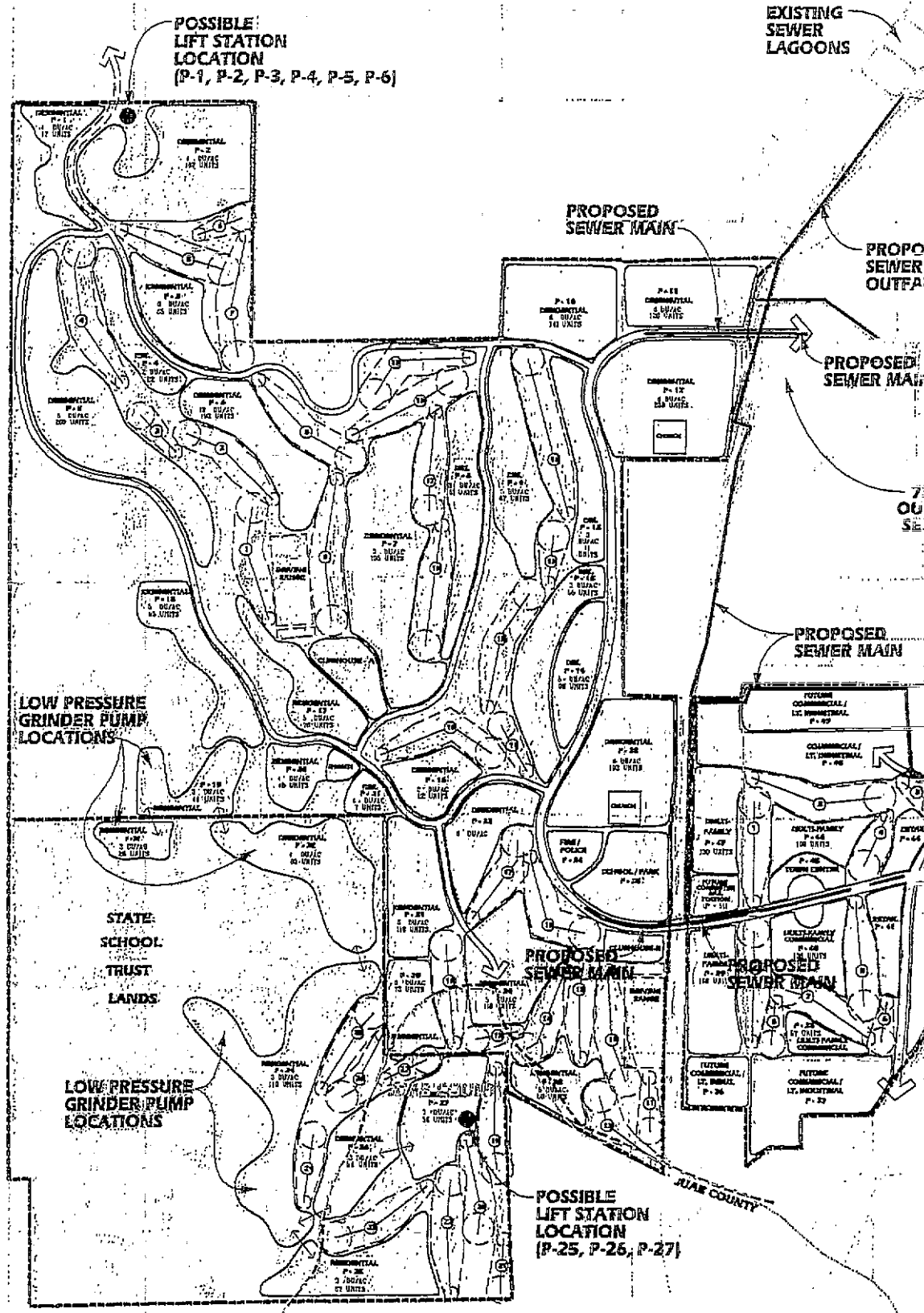
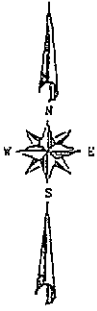
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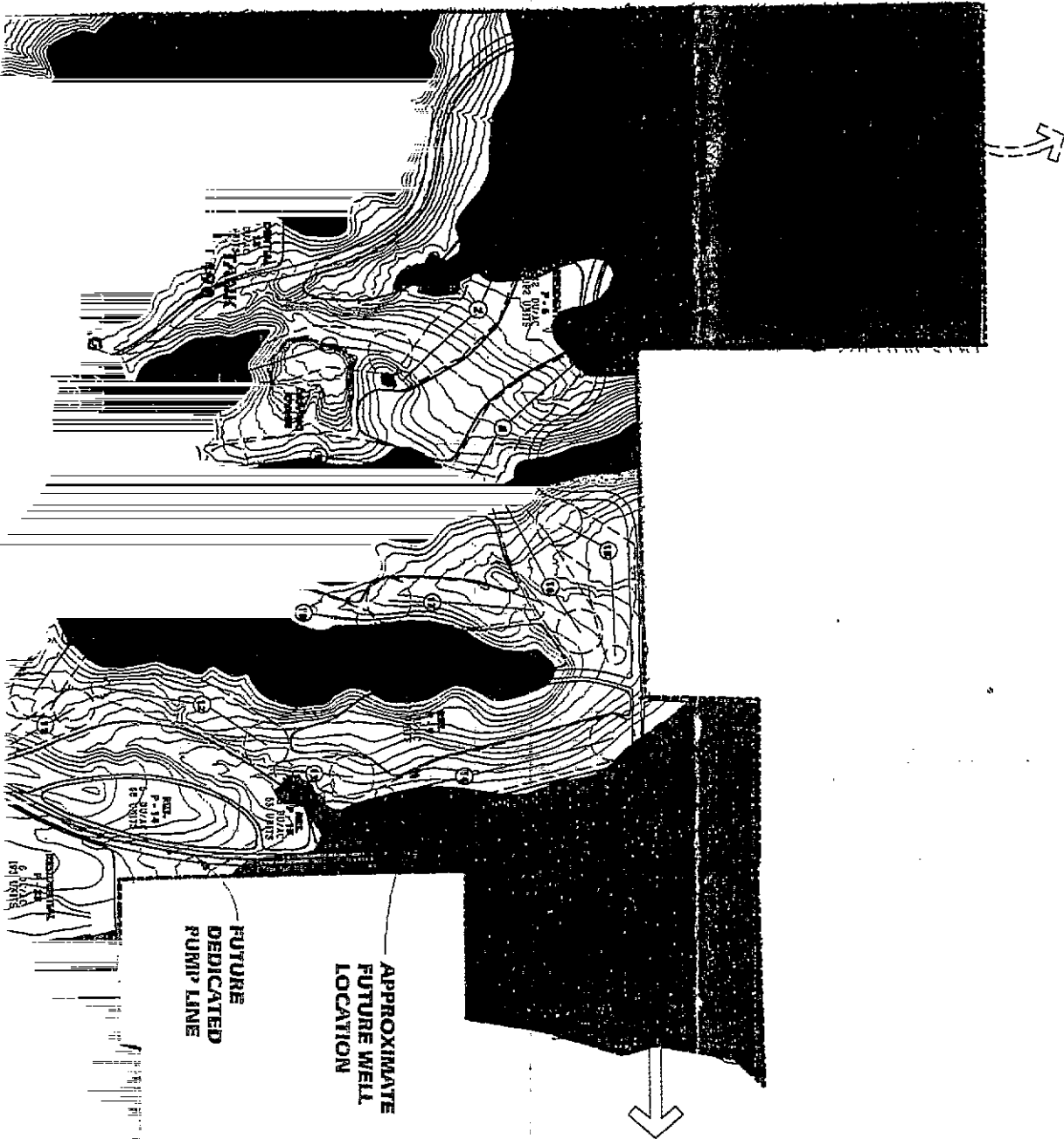
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				SUMMIT RIDGE		SECONDARY WATER						1785 No. Main St. #1 Spanish Fork, UT 84660 801-798-0555 Fax 801-788-9393	
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SUMMIT RIDGE SEWER SERVICE AREA

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SUMMIT RIDGE CULINARY WATER



APPROXIMATE
FUTURE WELL
LOCATION

FUTURE
DEDICATED
PUMP LANE

PRESSURE ZONES LEGEND

COLOR	ELEVATION	ZONE	PSI
[Dark Gray Box]	5,350	NO SERVICE	NO SERVICE
[Dark Gray Box]	5,160 TO 5,350	ZONE I	40 TO 140
[Dark Gray Box]	5,030 TO 5,150	ZONE II	40 TO 100
[Dark Gray Box]	4,800 TO 5,030	ZONE III	40 TO 100
[Dark Gray Box]	4,000	ZONE IV	40

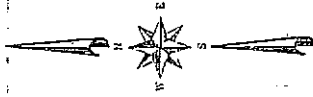


SUMMIT RIDGE SECONDARY WATER

PRESSURE ZONES LEGEND

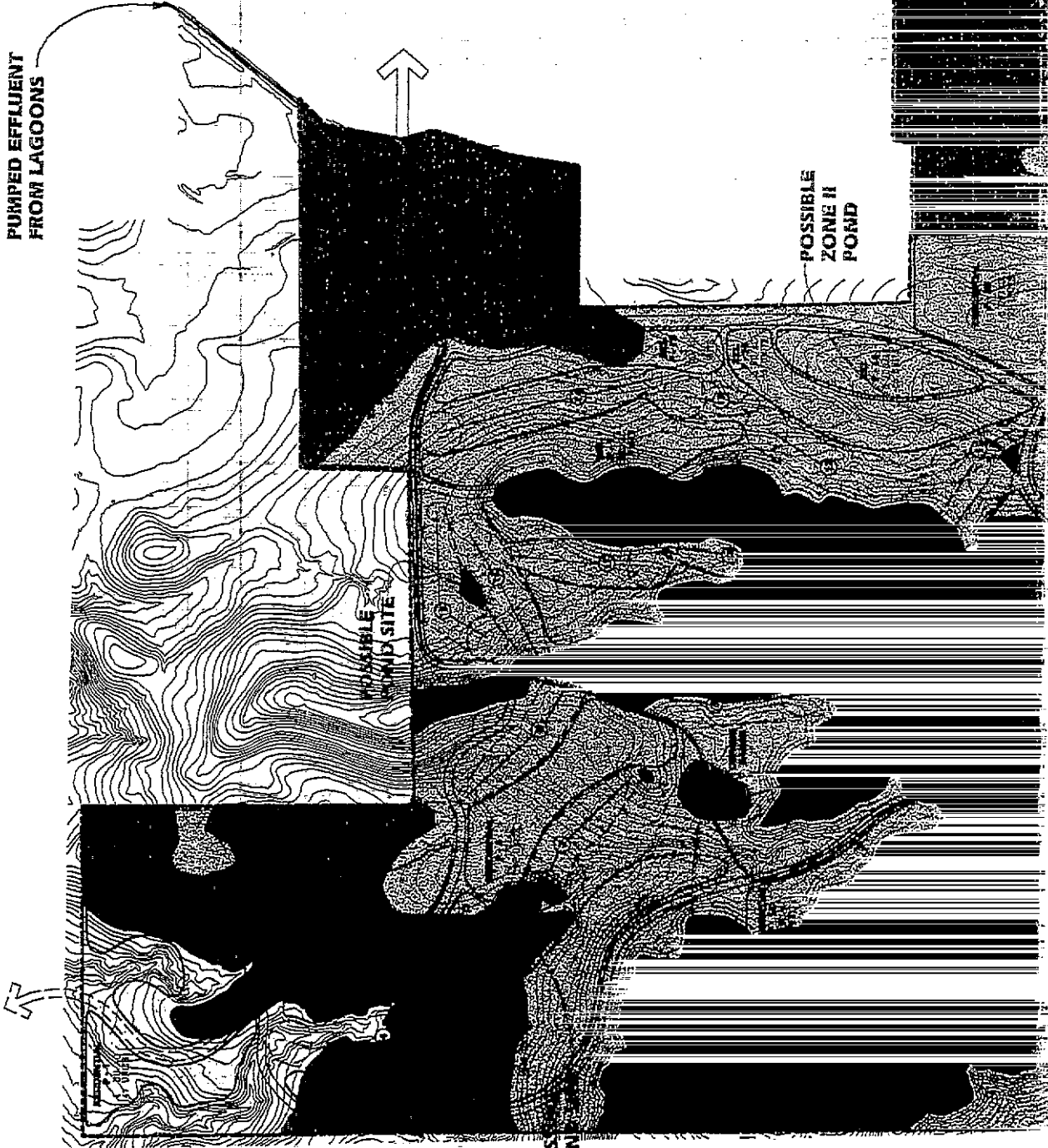
COLOR	ELEVATION	ZONE	P.S.I.
(White)	5,160 -	NO SERVICE	NO SERVICE
(Stippled)	5,000 TO 5,160	ZONE I	40 TO 110
(Cross-hatched)	4,860 TO 5,000	ZONE II	50 TO 110
(Solid Black)	0 TO 4,860	ZONE III	50 -

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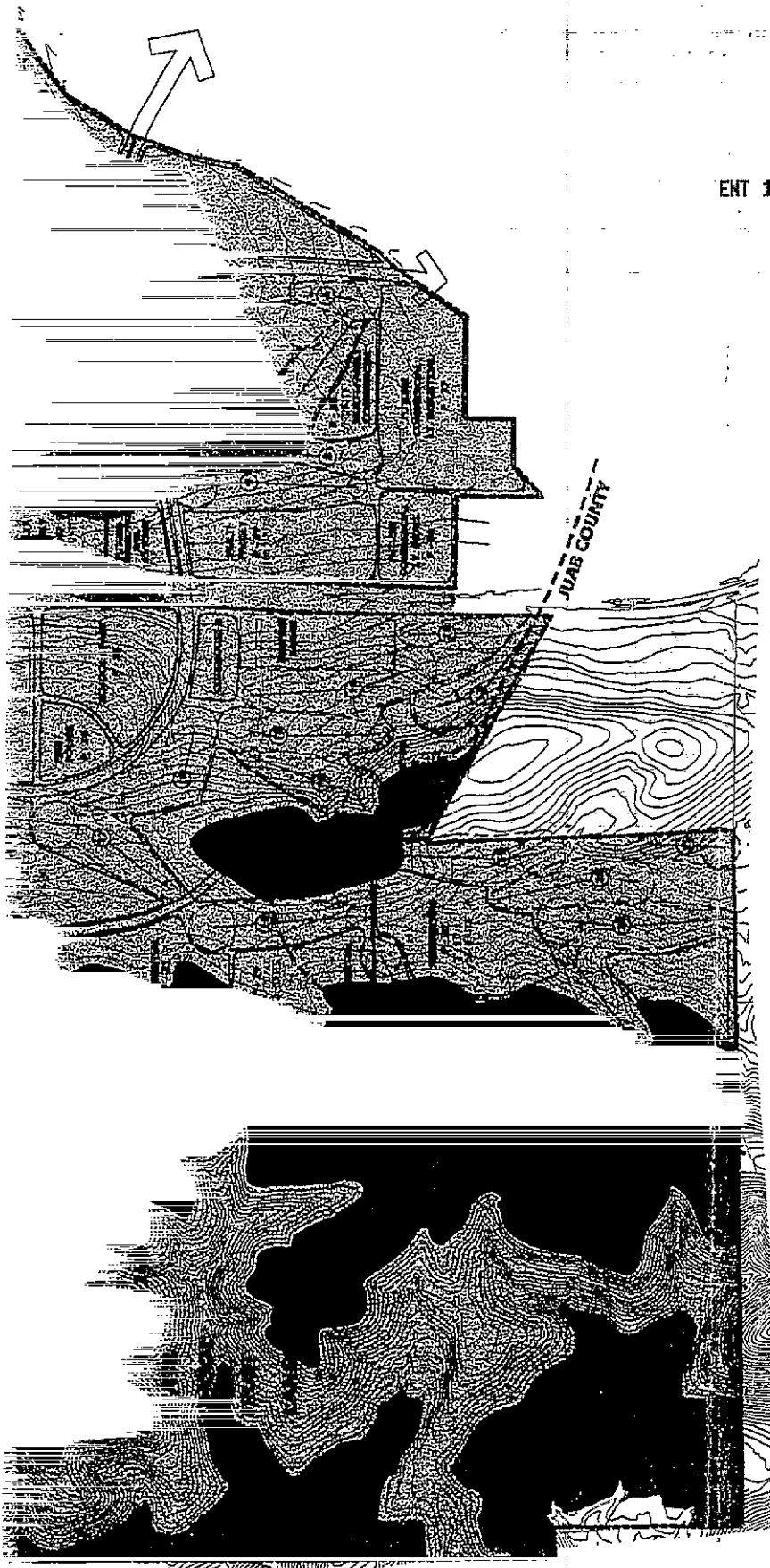


PUMPED EFFLUENT
FROM LAGOONS

POSSIBLE
ZONE II
POND




POS
PON



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REVISION	DATE	BY


LEI
 Consulting Engineers
 and Surveyors, Inc.
 1765 No. Main St. #1
 Spanish Fork, UT 84660
 801-798-0555 Fax 801-798-9393

SUMMIT RIDGE
SECONDARY WATER

DESIGNER	GDM/BTG	PROJECT	98635
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SANITARY SEWER

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Sanitary sewer service for the proposed development will be conveyed to the existing sewage lagoon treatment facility located northeast of the project. Please see the attached map as a reference for the following items:

(1) *Sewer Outfall Capacity.* According to Utah State Code, a sewer outfall line must be designed for either full buildout or for a 50 year life, whichever results in higher flow. Therefore, the proposed outfall line has been designed for full buildout of the serviceable area as shown on the enclosed map. In addition, an extra 10% capacity for 730 acres outside of Summit Ridge development was included. Flows are based upon estimated densities of Summit Ridge and the Utah State flow requirements. For areas outside Summit Ridge, a base density of 2.2 units per acre which is consistent with the R-M-15 zoning. Please see attached calculations which detail the outfall line flow requirements. Final pipe sizing will be determined once grades and slopes have been established. It is anticipated that a 24" RCP pipe will be adequate.

(2) *On-Site Sewer Service.* Where practical, the on-site sewer service will be gravity fed and lines will be of sufficient size and slope to accommodate the inflow. In areas which can not be reasonably serviced with gravity sewer, the following options are available:

(a) *Sewage Lift Station.* As indicated on the map, we anticipate two main areas which will require the service of a lift station. These lift stations will be municipal class, wet well/dry well design. Efforts will be made to keep materials and parts similar to those already in use by Santaquin City.

(b) *E/One Low Pressure Sewer Systems.* Where gravity sewer and municipal lift stations are unfeasible, low pressure gravity sewer systems will be used. These systems have the ability to connect several homes into a single pressurized line which will be conveyed to the nearest gravity sewer service. Please see the enclosed information provided by E/One for additional information.

SANITARY SEWER, continued

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(3) *Trunk and Outfall Line Alignments.* Preliminary discussions have taken place with the Union Pacific Railroad in regards to the placement of the sewer within the railroad right-of-way under a land lease contract with the City. Alternative alignments outside the railroad right-of-way will be pursued to determine the feasibility and easement costs.

(4) *Sewage Lagoon Capacity.* On a phase-by-phase basis, the City will determine the necessary upgrades to the existing ponds or other sewage systems to allow for the development. Participation is to be negotiated between the developer and the City.

STORM WATER

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Preliminary, two alternatives are being investigated to handle storm water runoff from the proposed development.

(1) *Discharge into Summit Creek Irrigation Pond.* Summit Creek Irrigation will be approached concerning discharge of storm water into their existing ponds in exchange for upgrades to the existing control structure and spill-way. It is understood that any storm water discharge into the pond will require a grease and oil separator. At a minimum, the existing pond will be used as a discharge point for a regrated flow of 0.20 CFS per acre of developable ground. This discharge is equal to the predevelopment historical flow which currently discharges to the pond.

(2) *Onsite Detention and Retention.* Due to the high permeability of the existing soils of the west side of the Union Pacific Railway, this area is ideal for detention ponds, retention ponds, and sumps. As soil studies are completed, areas with a high percolation rate will be identified to incorporate into the storm drainage facilities. Some facilities may be shared with the proposed secondary irrigation system.

The area east of the Union Pacific Railway will have a much lower percolation rate. This area will be serviced by detention basins with historical flow discharge to Summit Creek Irrigation Pond.

Where possible, any storm drain facilities will be integrated to open space and golf course areas for maintenance and aesthetics.

EXHIBIT E
SUMMIT RIDGE DEVELOPMENT LLC
MODERATE INCOME HOUSING PROVISION
SUMMIT RIDGE AT SANTAQUIN

In accordance with the Governor of Utah's Envision 2000 and in an effort to provide the City of Santaquin with quality affordable housing, the Developers of Summit Ridge in addition to meeting all the requirements of Utah Code Ann. § 10-9-307(2)(a), do hereby agree to use their best efforts as follows:

1. On those parcels in the Summit Ridge Development Plan designated 4 units per acre or above, Summit Ridge Development, LLC agrees to provide single family detached residential housing available for moderate income families. Said housing as of this date is defined as being affordable to persons earning 80 percent of the median income in Utah County. In addition, affordability is further defined as providing said persons, earning at least 80 percent of the median income in Utah County, housing that does not require more than 30 percent of their gross income as mortgage payment.
2. On those parcels designated in the Summit Ridge Development Plan referenced above, whose density is from 4 to 10 units per acre, single family attached housing and/or units available for lease will be provided in accordance with affordable housing as defined above. This may include, but is not limited to condominiums and townhouses.
3. Of the 3,322 total number of units in the development, not less than 10% or 332 units will be developed in accordance with paragraphs one and two above.
4. Although specific scheduling of construction is driven by market conditions and is not possible to determine at this time. The Developer shall construct 25% of the moderate income housing to be built pursuant to this plan on or before such time as 25% of all units in the Project are constructed with construction of an additional 25% on or before each of the 50% and 75% thresholders (of the total units) are achieved.
5. The Developer will meet with the appropriate officials of the City of Santaquin every quarter to update the City on the Developer's progress in regards to affordable housing as hereinabove explained.

**EXHIBIT E
PUBLIC AMENITIES PLAN
SUMMIT RIDGE AT SANTAQUIN**

Summit Ridge will donate to the City of Santaquin, free and clear of encumbrances, during the first phase of development, such portion of Parcel #35 as shown on the Summit Ridge Development Plan (Exhibit B), necessary to construct a regional park as defined by the City of Santaquin. Improvement of the park will be the responsibility of the Developer, with such improvements meeting all requirements of the City.

In addition, Parcel #34 as shown on the Summit Ridge Master Development Plan (Exhibit B), consisting of approximately 3.0 acres, will be donated during Phase I to the City of Santaquin, free and clear of liens and encumbrances, for use by the City for police and fire facilities. Additionally, the Developer will contribute up to \$150,000 toward the construction of said facilities. The donation of the \$150,000 will occur twenty-four months from the execution of this Agreement by the City.

Other public amenities such as hiking trails will be provided in conjunction with the progress of the Project as required by the City of Santaquin.

EXHIBIT F

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REIMBURSEMENT AGREEMENT

REIMBURSEMENT AGREEMENT

This Reimbursement Agreement ("Agreement") is made and entered into by and between Santaquin City, a third class city of the State of Utah ("City") and Summit Ridge Development, a Utah limited liability company, ("SRD"), effective as of the date set forth below.

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RECITALS:

WHEREAS, SRD is developing the Summit Ridge Project Area in the City ("Project") pursuant to a certain Annexation and Development Agreement dated 12-7-00; and

WHEREAS, in connection with the Project, SRD shall construct certain improvements, including, but not limited to, culinary and secondary water infrastructure, sanitary sewer infrastructure, and storm drainage infrastructure ("Reimbursable Infrastructure Improvements"), and shall dedicate these to the City upon completion by SRD and acceptance by the City; and

WHEREAS, there may be capacity in excess of that required for the Project in some of the Reimbursable Infrastructure Improvements ("Excess Capacity"); and

WHEREAS, property owners not participating in the Project may directly benefit from SRD's installation of the Reimbursable Infrastructure Improvements by utilization of such Excess Capacity; and

WHEREAS, the City may require the upsizing of some or all of the Reimbursable Infrastructure Improvements to provide additional capacity for future growth ("Upsized Capacity") and shall pay SRD for the additional costs of material and labor, if any, for such upsizing; and

WHEREAS, the City is willing to cooperate with SRD's recouping of a portion of the costs of the Reimbursable Infrastructure Improvements, exclusive of any Upsized Capacity costs, but does not wish to assume any liability with respect to such cooperative efforts,

NOW, THEREFORE, in consideration of the foregoing and the mutual covenants, promises, and conditions contained herein, and for good and valuable consideration, the receipt and sufficiency of which is hereby acknowledged, it is agreed as follows:

1. The City shall include in its standard infrastructure extension agreement a provision in substantially the following form and content:

The applicant is responsible for reimbursing SRD for a pro rata portion of reimbursable infrastructure improvements as a result of connecting on to any existing infrastructure installed by SRD and owned in part or in whole by the City, and for satisfying such reimbursement obligations as a condition of, and prior to, connection to existing infrastructure installed by SRD. Any such reimbursement obligations are in addition to all

normal fees and charges imposed by the City or the County (as applicable), including, but not limited to, impact fees.

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2. Subject to the terms hereof, the City shall not give any final plat or building permit approvals for projects which directly connect to any Reimbursable infrastructure improvements until the applicant for such approval (an "Owner") has demonstrated that it has either paid SRD the appropriate reimbursement fees or has obtained written waiver of said fees from SRD.
3. SRD may charge and collect reimbursement fees from any Owner of property within the Project's boundaries who has joined and participated in the Project, based on the pro rata share of the capacity of the improvement to be utilized by such Owner.
4. SRD may charge and collect reimbursement fees from any Owner of property outside of the Project's boundaries based on the installation cost of said infrastructure, a pro-rata share of the Excess Capacity which will be utilized by such Owner, and the expected remaining useful life of such infrastructure connected to. SRD may collect such reimbursement fees only to the extent that such costs are directly allocable to Excess Capacity. Once all of the costs associated with Excess Capacity have been reimbursed, no further reimbursements may be sought or obtained from any such Owner.
4. SRD may neither seek nor collect reimbursements for any costs associated with Upsized Capacity so long as SRD is reimbursed by the City for the additional costs of labor and material for such upsizing.
5. This Agreement shall apply to applications filed for final plat or building permit approvals for projects which directly connect to any Reimbursable infrastructure improvements within the twenty year period immediately after the effective date of this Agreement.
6. This Agreement does not alter SRD's obligations concerning payment of the City's standard connection and other fees, in any way.
7. SRD agrees to comply with all City ordinances, policies, and rules, and with the terms of each line extension agreement it executes with the City, regardless of the status of this Agreement.
8. If any part of this Agreement is found, deemed, or rendered invalid or unenforceable by a court of competent jurisdiction or by the Legislature of the State of Utah, the parties shall be relieved of any and all obligations under such provisions of this Agreement.
9. a. SRD shall indemnify and hold harmless the City, and all of its officers, agents, employees, and representatives, from any and all claims, damages, or liabilities of any nature related to this Agreement including, but not limited to, damages arising from claims that the requirement of payment of reimbursement fees to SRD is illegal, unconstitutional, or excessive.

b. SRD shall reimburse the City for administrative time, expenses, reasonable attorneys' fees, and costs associated with, or arising out of, this Agreement or the City's efforts to implement its terms, so long as SRD is given prior written notice and an opportunity to defend such action.

c. Furthermore, should the City be prohibited from enforcing this Agreement on SRD's behalf, by state statute or regulation, court order, or executive decree, the City shall have no further obligations to SRD under this Agreement.

10. This Agreement shall be governed by the laws of the State of Utah and shall inure to the benefit of, and bind the successors and assigns of the respective parties.

11. Waiver of any particular duty or condition under this Agreement shall not constitute a waiver for any other duty or condition, regardless of whether it is a like, related, or subsequent duty or condition.

12. This Agreement is the entire agreement between the parties and it may only be changed, modified, or amended by written agreement of each of the parties and does not create a joint venture or agency relationship between the parties.

13. In the event that this Agreement must be enforced by legal action or the meaning of this Agreement becomes subject to a declaratory judgement, the prevailing party shall be entitled to all costs and expenses of such legal action including but not limited to reasonable attorneys' fees.

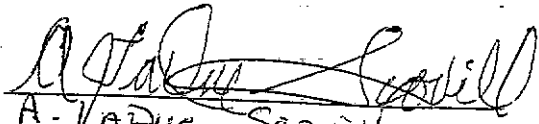
15. The failure of the City to withhold a plat approval or a building permit pursuant to this Agreement shall not create in SRD a claim or right of action against the city.

16. This Agreement shall become effective as of the date upon which all parties have duly executed this Agreement, and shall expire, becoming null and void, twenty years after the effective date.

IN WITNESS WHEREOF the parties have caused this Agreement to be executed on the respective dates indicated below.

12-6-00
date

SANTAQUIN CITY:

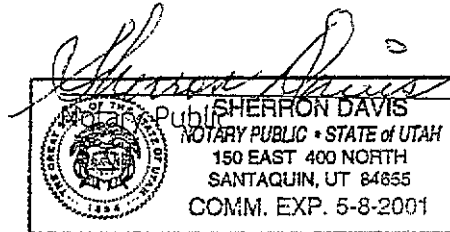
by: 
name: A. J. Due
title: Mayor

CITY ACKNOWLEDGMENT

State of Utah }
: SS.
County of _____ }

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On the 7 day of Dec, 2000, La Due Scovill personally appeared before me and duly acknowledged to me that he/she executed the foregoing instrument on behalf of Santaquin City and also acknowledged and certified to me that he/she was and is duly authorized by Santaquin City to execute the foregoing instrument on behalf of the City and to thereby bind the City to its terms.



SUMMIT RIDGE DEVELOPMENT:

_____ date
by: _____
name: _____
title: _____

SRD ACKNOWLEDGMENT

State of Utah }
: SS.
County of _____ }

On the ____ day of _____, 2000, _____ personally appeared before me and duly acknowledged to me that he/she executed the foregoing instrument and also acknowledged and certified to me that he/she was and is duly authorized by said the Summit Ridge Development to execute the foregoing instrument on behalf of said entity and to thereby bind the said entity to its terms.

Notary Public

EXHIBIT G

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**CITY STANDARDS AND SPECIFICATIONS
FOR PUBLIC IMPROVEMENTS**

SANTAQUIN CITY

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DEVELOPMENT STANDARDS & SPECIFICATION DETAILS

August 2000



Santaquin City Resolution 3-1-98 Providing For the Installation of C-900 PVC waterline in place of Ductile Iron For Some Applications

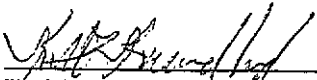
Whereas the City of Santaquin now has policy as stated in the Book of Standards that allows only the installation of Ductile Iron for use as waterlines in the municipality, and

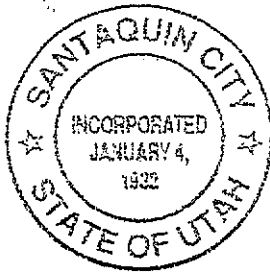
Whereas C-900 PVC has been tested in numerous other cities and has proved to be durable, easier to install, and less expensive than Ductile, and

Whereas the City Engineer has recommended that the City of Santaquin change the "Ductile Iron for water lines" only policy;

Now Therefore **Be It Resolved**, that C-900 PVC waterline will be allowed to be used within the municipality of Santaquin in place of Ductile iron on a "case by case" basis as reviewed and approved by the City Engineer.

Approved and Adopted by the Santaquin City Council this 3rd Day of March, 1998


Keith Broadhead, Mayor



Attest: 
Susan Farnsworth/Recorder

SANTAQUIN CITY
45 WEST 100 SOUTH
SANTAQUIN, UT 84655
801-754-3211

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THESE DRAWING REQUIREMENTS MUST BE ON THE SPECIFIC PAGES LISTED BELOW. IF EACH ITEM IS NOT LISTED- PLANS WILL NOT BE REVIEWED!!!!

PAGE 1 "COVER SHEET" should include, but not limited to, the following:

1. Entire development or subdivision
2. Delineate areas of the subdivision which are not associated with the phase or phases being presented.
3. Vicinity map of subdivision and it's location within the City.
4. Lot or parcel numbers, proposed street names or addresses, and location of trails and parks.
5. Dashed lines showing division between phases.
6. "Contents section" which identifies drawing, page number, and its contents.
7. Owner's name, address, and phone number.
8. Developers name, address, and phone number.
9. Engineering Firm, name of Engineer, or other contact, address, and phone number.
10. Original drawing date and each subsequent revision dates.
11. North arrow.
12. Density table with the following:
 - A. Proposed zoning.
 - B. Total Acreage of area proposed for development.
 - C. Total acreage in lots.
 - D. Total acreage in open spaces.
 - E. Percentage of open space.
 - E. Total number of lots.
 - G. Density in units per acre.
 - H. Proposed project phasing.
 - I. Green space (if applies).

PAGE 2 "LEGAL SURVEY DRAWINGS" (one for each phase submitted) should include, but not limited to, the following:

1. Vicinity map of subdivision and it's location within the City.
2. Legal description and boundary description.
3. Legal survey, monuments, section corners, etc.
4. Proposed zoning.
5. Curve table.
6. State plane coordinates.
7. Line table.
8. Lot or parcel numbers.
9. Square footage of each lot.
 - A. Foot print of proposed building showing all easements and setbacks.

SUBDIVISION PLAN DRAWING REQUIREMENTS

PAGE 2 OF 3

10. North arrow.
11. Proposed lot addresses and existing surrounding addresses. ENT 102458:2000 PG 158 of 480
12. Original drawing date and each subsequent revision dates.
13. Owner's name, address, and phone number.
14. Developers name, address, and phone number.
15. Engineering Firm, name of Engineer, or other contact, address, and phone number.

PAGE 3 "PLAN AND PROFILE SHEET" should include, but not limited to, the following:

1. All surrounding land and developments, within 300', showing the following existing utilities.
 - A. Location of water lines, sizes, and valves.
 - B. Location of existing fire hydrants and distance to next hydrant on proposed subdivision.
 - C. Location of existing roads, center line of road, and edge of asphalt that tie into the proposed development.
 - D. Location of existing sewer lines, size of pipe, and location of manholes. Must also include depth of "tie in" sewer manhole.
 - E. Location of telecommunication cable.
 - F. Location of Natural Gas lines.
 - G. Location of existing storm drain system (if applies).
 - H. Location of existing street lights.
 - I. Location of existing electrical lines.
 - J. Location of existing curb, gutter, sidewalk and proposed "tie in" to new development.
 - K. Location of other buried utility.
2. North arrow.
3. Two (2) foot contour intervals.
4. Proposed stop signs.
5. Proposed street signs.
6. Proposed fire hydrant locations and connections.
7. Proposed street light locations.
8. Proposed cluster mail box locations.
9. Proposed roads, road widths, and center lines.
10. Proposed curb, gutter, and sidewalks.
11. Proposed water line size and laterals.
12. Proposed lot or parcel numbers.
13. Proposed sewer line size and laterals.
14. Proposed natural gas lines.
15. Proposed telecommunication cables.
16. Proposed storm drain system.
17. Proposed electrical lines.
18. Original drawing date and each subsequent revision dates.
19. Owner's name, address, and phone number.
20. Developers name, address, and phone number.

SUBDIVISION PLAN DRAWING REQUIREMENTS

PAGE 3 OF 3

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21. Engineering Firm, name of Engineer, or other contact, address, and phone number.

PAGE 4 "DETAIL SHEET" should include, but not limited to, the following:

1. All applicable details and page number from Santaquin City Standard Drawings.
2. Original drawing date and each subsequent revision date.
3. Owner's name, address, and phone number.
4. Developers name, address, and phone number.
5. Engineering Firm, name of Engineer, or contact person, address, and phone number.

*****DIGITAL COPY COMPATIBLE WITH AUTOCAD VERSION 14
MUST ACCOMPANY SUBMITTED DRAWINGS WITH SUBDIVISION
NAME AND SUBMITTED DATE*****

Trails may apply

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STANDARD DRAWINGS

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1000. GENERAL

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This section defines the general requirements for improvements to be built by the Developer, Subdivider, CITY, or Contractor for all types of construction, (to include residential, commercial, industrial and professional office).

The improvements shall include all street improvements in front of all lots and along all dedicated streets to a connection with existing improvements of the same kind or to the boundary of the subdivision nearing existing improvements. Layout must provide for future extension to adjacent development and to be compatible with the contour of the ground for proper drainage. All water lines, sewer lines, and any other buried conduit shall be installed to the boundary of the subdivision or development.

INDEX OF SUBSECTIONS

01000.1 - Definitions	01000.17 - Subsurface Conditions
01000.2 - Additional Instructions & Detail Drawings	01000.18 - Suspension of Work, Termination and Delay
01000.3 - Schedules, Reports and Records	01000.19 - Payments to Contractor
01000.4 - Drawings and Specifications	01000.20 - Acceptance of Final Payment as Release
01000.5 - Shop Drawings	01000.21 - Insurance
01000.6 - Materials, Services and Facilities	01000.22 - Contract Security
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01000.10 - Surveys, Permits, Regulations	01000.26 - Subcontracting
01000.11 - Protection of Work, Property, Persons	01000.27 - Engineer's Authority
01000.12 - Supervision by Contractor	01000.28 - Land and Rights-of-Way
01000.13 - Changes in the Work	01000.29 - Guarantee
01000.14 - Changes in Contract Price	01000.30 - Arbitration
01000.15 - Time for Completion & Liquidated Damages	01000.31 - Taxes
01000.16 - Correction of Work	

01000.1 DEFINITIONS

Wherever used in the CONTRACT DOCUMENTS, the following terms shall have the meanings indicated which shall be applicable to both the singular and plural thereof:

- 01000.1.1 ADDENDA - Written or graphic instruments issued prior to the execution of the AGREEMENT which modify or interpret the CONTRACT DOCUMENTS, DRAWINGS, and SPECIFICATIONS, by additions, deletions, clarifications, or corrections.
- 01000.1.2 AGREEMENT OR CONSTRUCTION CONTRACT AGREEMENT - The written contract between the OWNER and the CONTRACTOR covering the work to be performed; other CONTRACT DOCUMENTS are attached to the AGREEMENT and made part thereof as provided therein.
- 01000.1.3 BID SCHEDULE - The offer or proposal of the BIDDER submitted on the prescribed form setting forth the prices and scheduling for the WORK to be performed.
- 01000.1.4 BIDDER - Any person, firm, or corporation submitting a BID SCHEDULE for the WORK.
- 01000.1.5 BLOCK. The land surrounded by streets and other rights-of-way other than an alley, or land which is designated or shown as a block on any recorded subdivision plat, or official map of plat adopted by the CITY COUNCIL.

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- 01000.1.6 BONDS - BID, PERFORMANCE, and PAYMENT BONDS and other instruments of security, furnished by the CONTRACTOR and its surety in accordance with the CONTRACT DOCUMENTS.
- 01000.1.7 CHANGE ORDER - A written order to the CONTRACTOR authorizing an addition, deletion, or revision in the WORK within the general scope of the CONTRACT DOCUMENTS, or authorizing an adjustment in the CONTRACT PRICE and/or CONTRACT TIME.
- 01000.1.8 CITY ENGINEER. The person or firm appointed by the City Council to act as the City of Santaquin City Engineer.
- 01000.1.9 COMPLETION DATE. The date the entire project, subdivision or development is completed and an approved final inspection statement is given.
- 01000.1.10 CONSTRUCTION PLANS AND PROFILES. Plans drawn by a registered civil engineer or land surveyor showing all required improvements including the location, size, grade and elevations. Plans also include all details required to accurately show what work will be performed to meet these STANDARDS.
- 01000.1.11 CONTRACT DOCUMENTS - The contract, including Advertisement for BIDS (or notice to CONTRACTORS of Intention to Receive Bids). Instructions to BIDDERS, BID, BID BOND, AGREEMENT, PAYMENT BOND, PERFORMANCE BOND, NOTICE OF AWARD, NOTICE TO PROCEED, CHANGE ORDER, DRAWINGS, SPECIFICATIONS, Supplemental Instructions, SPECIAL CONDITIONS and ADDENDA.
- 01000.1.12 CONTRACT PRICE - The total moneys payable to the CONTRACTOR under the terms and conditions of the CONTRACT DOCUMENTS.
- 01000.1.13 CONTRACT TIME - The number of calendar days stated in the CONTRACT DOCUMENTS for the completion of the WORK.
- 01000.1.14 CONTRACTOR - The person, firm, developer, subdivider, corporation with whom the Owner has executed the AGREEMENT.
- 01000.1.15 COUNCIL OR CITY COUNCIL. The governing body of the city.
- 01000.1.16 DEVELOPER. Person, persons, partnership or corporation developing residential, commercial or industrial property.
- 01000.1.17 DEVELOPMENT REVIEW COMMITTEE (DRC). A review committee which makes recommendations to the Planning and Zoning Commission.
- 01000.1.18 DRAWINGS - The part of the CONTRACT DOCUMENTS, which show the characteristics and scope of the WORK to be performed and which have been prepared or approved by the ENGINEER.
- 01000.1.19 FIELD ORDER. A written order affecting a change in the WORK, not involving a material adjustment in the CONTRACT PRICE or an extension of the CONTRACT TIME, issued by the ENGINEER to the CONTRACTOR during construction.

- 01000.1.20 FINAL GRADING. The last stages of excavation or filling or combinations of excavation or filling prior to the installation of concrete or bituminous paving.
- 01000.1.21 FINAL PLAT APPROVAL. The final approval of the City and signing of the plat by the MAYOR and ENGINEER.
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- 01000.1.22 IMPROVED LOT. A lot which has all the improvements required in this section of the General Conditions.
- 01000.1.23 IMPROVEMENTS. Includes roads, streets, curb, gutters, sidewalks, grading, landscaping, water and sewer systems, drainage systems, fences, and public facilities as required by these specifications.
- 01000.1.24 LAND SURVEYOR. A person registered with the State of Utah to practice as a licensed land surveyor.
- 01000.1.25 LOT. A parcel or tract of land within a subdivision, which is or may be occupied by a building or structure and the accessory buildings, structures or uses customarily incident thereto, including such open spaces as are arranged and designated to be used in connection with the building according to the zone within which the lot is located.
- 01000.1.26 MASTER PLAN. The comprehensive land use plan document as approved by the CITY COUNCIL.
- 01000.1.27 NOTICE OF AWARD - The written notice of the acceptance of the BID, from the OWNER to the successful BIDDER, which also sets the time in which the CONTRACT must be signed.
- 01000.1.28 NOTICE TO PROCEED - Written communication issued by the OWNER to the CONTRACTOR authorizing the CONTRACTOR to proceed with the WORK and establishing the date of commencement and completion of the WORK.
- 01000.1.29 OFFSITE FACILITIES. Facilities outside of the boundaries of the subdivision or development site, which are designated and located to serve the needs of the subdivision or development or adjacent property, usually lying between a development and existing facilities.
- 01000.1.30 ONSITE FACILITIES. Facilities installed within or on the perimeter of the subdivision or development site.
- 01000.1.31 OWNER - City of Santaquin
- 01000.1.32 PRELIMINARY PLAT. A map or plat of a proposed subdivision or development with accompanying supplementary documents.
- 01000.1.33 PROJECT - The total construction of the WORK to be provided under the CONTRACT DOCUMENTS, which may be the whole or a part as indicated elsewhere in the CONTRACT DOCUMENTS.
- 01000.1.34 PUBLIC UTILITY EASEMENTS. The easements required to place public utilities across any privately owned property.
- 01000.1.35 RESIDENT PROJECT REPRESENTATIVE - The authorized representative of the OWNER who is assigned to the PROJECT site or any part thereof.

- 01000.1.36 SAMPLES - Physical examples of materials, equipment or workmanship that are representative of some portion of the WORK and which establishes the standards by which such portion of the WORK will be judged.
- ENT 102458:2000 PG 165 of 480
- 01000.1.37 SHOP DRAWINGS - All drawings, diagrams, illustrations, brochures, schedules, and other data which are prepared by the CONTRACTOR, SUBCONTRACTOR, manufacturer, SUPPLIER or distributor, which illustrate how specific portions of the WORK shall be fabricated or installed.
- 01000.1.38 SPECIAL PROVISIONS - Additions and modifications to the Standard Specifications specifically prepared for the Contract.
- 01000.1.39 SPECIFICATIONS - A part of the CONTRACT DOCUMENTS consisting of written descriptions of a technical nature of materials, equipment, construction systems, standards and workmanship.
- 01000.1.40 SUBCONTRACTOR - An individual, firm or corporation having a direct contract with the CONTRACTOR or with any other SUBCONTRACTOR for the performance of a part of the WORK at the site.
- 01000.1.41 SUBSTANTIAL COMPLETION - That date as certified by the ENGINEER when the construction of the WORK or a specified part thereof is sufficiently completed, in accordance with the CONTRACT DOCUMENTS, so that the WORK or specified part can be utilized for the purposes for which it is intended.
- 01000.1.42 SUBDIVISION. The first division of any tract or parcel of land, for the purpose, whether immediate or future, of selling or for building development.
- 01000.1.43 SUPPLEMENTAL GENERAL CONDITIONS - The part of the CONTRACT DOCUMENTS which amends or supplements these General Conditions.
- 01000.1.44 SUPPLIER - Any person or organization who supplies materials or equipment for the WORK, including that fabricated to a special design, but who does not perform labor at the site.
- 01000.1.45 UTILITIES. Including natural gas lines, culinary water lines, irrigation lines, sanitary and storm sewer lines, electric power lines, cable television and telephone transmission lines, underground conduits, and junction boxes and all appurtenances to these items listed.
- 01000.1.46 WARRANTY PERIOD. Warranty period is two years after CITY approval of subdivision improvements or two years after CITY approval of repairs or replacement of subdivision improvements, whichever is longer.
- 01000.1.47 WORK - All labor necessary to produce the construction required by the CONTRACT DOCUMENTS, and all materials and equipment incorporated or to be incorporated in the Contract.
- 01000.1.48 WRITTEN NOTICE - Any communications to any party of the AGREEMENT relative to any part of the AGREEMENT prepared in writing and considered delivered and the service thereof completed, when posted by certified or registered mail to the said party at its last given address, or delivered in person to said party or their authorized representative on the WORK.
- 01000.1.49 ZONING ORDINANCE. The zoning ordinances of the CITY as adopted by the CITY COUNCIL.

01000.2 ADDITIONAL INSTRUCTIONS AND DETAIL DRAWINGS

01000.2.1 The CONTRACTOR may be furnished additional instructions and/or detail drawings, by the ENGINEER, as necessary to carry out the WORK required by the CONTRACT DOCUMENTS.

01000.2.2 The additional drawings and/or instruction thus supplied will become a part of the CONTRACT DOCUMENTS. The CONTRACTOR shall carry out the WORK in accordance with the additional detail drawings and instructions.

01000.2.3 PRELIMINARY PLAT

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01000.2.3.1 FILING - A developer must review the conceptual plan for a development with the city planner before a preliminary plat may be submitted. The city planner then schedules the conceptual plan to be reviewed at a pre application meeting. At this meeting, the feasibility and the major requirements for the development are outlined by the various departments in the city. The developer should then draft a preliminary plat.

To apply for a preliminary plat, complete a Preliminary Plat Application form and submit to the engineering secretary with the following:

1. Ten (10) 24x36 copies of the plat drawings folded to a 9x12 size so the name of the subdivision is visible;
2. Two (2) 11x17 copies of the plat drawings;
3. A computer aided design (CAD) file of the plat must be submitted on a 3 1/2" disk, zip disk or CD in an AutoCAD or dxf format. The CAD file of the subdivision must be in the 1927 North American Datum (NAD27) State Plane Coordinate System with a tie to a section corner;
4. Payment of all the fees for preliminary plats.

The city will review the submission and notify the developer of any changes that must be made. Once these changes are made, one (1) 24x36 copy, one (1) 11x17 copy and a CAD file of the plat and ten (10) bound subdivision packets must be submitted to the engineering secretary. The subdivision packet shall include a project overview, plat drawings, product elevations, landscape plan, description and design of amenities, CC&R's, and soil reports. The description and design of amenities shall include detailed drawings and pictures of proposed playgrounds, open space, trails, streetscapes, architectural variety, fencing, and any other items deemed necessary by the City Engineer. All drawings and packets must be updated with any changes made by the Development Review Committee, Planning Commission, and City Council after each meeting. If anything is submitted by e-mail the engineering secretary must be contacted for the proper e-mail address and for confirmation the e-mail was received.

01000.2.3.2 FORM AND CONTENTS

The preliminary plat of a subdivision shall contain the following information.

- A. The proposed name of the subdivision;
- B. The location of the subdivision as a part of some larger subdivision or tract of land referred to in the records of the county recorder. In such case, a sketch of the prospective street system of the unplatted parts of the subdivider's land shall be submitted and the street system of the part submitted shall be considered in light of existing master street plans or other planning commission street studies;
- C. The names and addresses of the developer, the engineer or surveyor of the subdivision; or other persons to whom notice of the hearing to be held by the City Council should be sent;
- D. Sufficient information to locate accurately the property shown on the plat and the location and principal dimensions of recorded section lines, streets, alleys, easements,

- watercourses, sewer, gas, fence lines and building within 500 feet of the subdivision, water mains and all other important features within and adjacent to the tract to be subdivided;
- E. The location, areas and principal dimensions of all proposed streets, alleys, easements, lot lines and areas to be reserved for public use;
 - F. The date of preparation, a standard engineering scale (not more than one hundred (100) feet to the inch) and a north arrow;
 - G. A contour map with vertical intervals not to exceed five (5) feet, or where such information is not obtainable, a centerline profile for all proposed right-of-ways. All vertical data shall be based on the 1929 North American Vertical Datum (NAVD29).
 - H. The names of all adjacent subdivisions and property owners; and
 - I. A table including: 1) Total acreage of area proposed for development 2) Total acreage in lots 3) Total acreage in open space 4) Percent of open space 5) Total number of lots 6) Density in lots per acre.
 - J. Developer must provide a detailed soils report addressing the following issues: 1) Hill stabilization, 2) Road design, 3) Foundation design, 4) Groundwater impacts, and 5) General soil stability.

01000.2.4 FINAL PLAT

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01000.2.4.1 FILING

To apply for a final plat, complete a Final Plat Application form and submit to the engineering secretary with the following:

1. Ten (10) 24x36 copies of the plat folded to a 9x12 size so the name of the subdivision and plat is visible;
2. Two (2) 11x17 copies of the plat;
3. A computer aided design (CAD) of the plat must be submitted on a 3 1/2" disk, zip disk or CD in an AutoCAD or dxf format. The CAD file of the subdivision must be in the NAD27 State Plane Coordinate System with a tie to a section corner;
4. A copy of exhibit "A" for the Conditions, Covenants and Restrictions (CC&R's).

The city will review the submission and notify the developer of any changes that must be made. Once these changes are made and accepted by Santaquin City, one (1) 24x36 copy, one (1) 11x17 copy and a CAD file of the plat must be submitted to the engineering secretary. If anything is submitted by e-mail the engineering secretary must be contacted for the proper e-mail address and for confirmation the e-mail was received.

01000.2.4.2 FORM AND CONTENTS

The final plat of a subdivision shall contain the following:

- A. Accurate dimensions for all lines, angles and curves used to describe boundaries, streets, alleys, easements, areas to be reserved for public use and other important features; the lines, angles, dimensions, State plane coordinates, bearings, areas and numbers of all lots, blocks and parts reserved for any reason within the subdivision. All dimensions shall be determined by an accurate field survey which shall balance and close within a limit of one in ten thousand;
- B. All lots and blocks are to be numbered and named in accordance with the street numbering and naming system assigned by the City on the preliminary plat, unless the planning commission and the City Council have given their prior approval for a different naming and numbering system;
- C. A statement that "all water lines up to and including the meter, all sewer mains, pressurized irrigation lines up to and including the stop and waste, and up to and including the meter are dedicated to Santaquin City."

- D. All drawings and signatures shall be in waterproof ink with outer dimensions of twenty-four (24) inches by thirty-six (36) inches. There shall be an unencumbered margin of one and one-half inches on the left-hand side of the sheet and not less than a half inch margin around the outer three sides of the sheets. The scale shall be a standard engineering scale no more than one hundred (100) feet to the inch. Plats shall be submitted on Mylar.
- E. When more than one sheet is required, an index sheet of the same size shall be filed showing the entire subdivision with the individual sheets blocked out thereon as a key; and
- F. Four copies of the construction drawings, including all plan and profile drawings shall be submitted with the final plat for review. Two copies will be retained by the City, the other two copies will be signed and stamped by the City and returned to the developer. A copy of the signed and approved construction drawings shall be on site at all times.
- G. As-built drawings (to scale) will be provided by the developer within 30 days of completion of underground utilities. As-builts need to include water, sewer, pressurized irrigation, storm drain, irrigation lines, water laterals, sewer laterals, and pressurized irrigation laterals, manholes, valves, fittings, appurtenances, fire hydrants, meters, power, electrical conduits, transformers, street lights, sectionalizers, junction boxes and any other underground facility. The as-builts must be submitted on 24x36 mylar sheets and a CAD file on a 3 1/2" disk, zip disk or CD in an AutoCAD or dxf format. The CAD file of the subdivision must be drawn from an accurate field survey in the NAD27 State Plane Coordinate System with a tie to a section corner. If anything is submitted by e-mail the engineering secretary must be contacted for the proper e-mail address and for confirmation the e-mail was received.

01000.3.4.3. RECORDATION

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A copy of said final plat shall be kept on file in the office of the city engineer or his/her designee for use by the city.

Prior to the construction of any improvements required by this title or the submission of any bond, the subdivider shall furnish to the city engineer or his/her designee all plans, information and data necessary for said improvements. These plans shall be examined by the city engineer or his/her designee and shall be approved and determined to be in accordance with the improvements and design standards of the City. Following the approval of construction drawings, but prior to the recording of the plat, a Questar approved design of the gas lines shall be submitted to Santaquin City.

01000.3 SCHEDULES, REPORTS AND RECORDS

01000.3.1 The CONTRACTOR shall submit to the CITY such schedule of quantities and costs, progress schedules, payrolls, reports, estimates, records and other data where applicable as are required by the CONTRACT DOCUMENTS for the WORK to be performed.

01000.3.2 At the Pre-Construction Conference, the CONTRACTOR shall submit a construction progress schedule showing the order in which it proposes to perform the WORK, including dates at which they will start the various parts of the WORK, estimated date of completion of each part and, as applicable:

- The dates at which special detail drawings will be required; and

- Respective dates for submission and approval of SHOP DRAWINGS, the beginning of manufacture, the testing and the installation of materials, supplies, and equipment.

01000.3.3 The CONTRACTOR shall also submit a schedule of payments that it anticipates will be earned during the course of the WORK.

01000.4 DRAWINGS AND SPECIFICATIONS

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01000.4.1 The intent of the DRAWINGS and SPECIFICATIONS is that the CONTRACTOR shall furnish all labor, materials, tools, equipment, and transportation necessary for the proper execution of the WORK in accordance with the CONTRACT DOCUMENTS and all incidental work necessary to complete the WORK in an acceptable manner, ready for use, occupancy or operation by the OWNER.

01000.4.2 In case of conflict between the DRAWINGS and SPECIFICATIONS, the SPECIFICATIONS shall govern. Figure dimensions on DRAWINGS shall govern over scale dimensions, and detailed DRAWINGS shall govern over general DRAWINGS.

01000.4.3 Any discrepancies found between the DRAWINGS and SPECIFICATIONS and site conditions or any inconsistencies or ambiguities in the DRAWINGS or SPECIFICATIONS shall be immediately reported to the ENGINEER, in writing, who shall promptly correct such inconsistencies or ambiguities in writing. WORK done by the CONTRACTOR after its discovery of such discrepancies, inconsistencies or ambiguities shall be done at the CONTRACTOR'S risk.

01000.5 SHOP DRAWINGS

01000.5.1 The CONTRACTOR shall provide SHOP DRAWINGS as may be necessary for the prosecution of the WORK as required by the CONTRACT DOCUMENTS. The ENGINEER shall promptly review all SHOP DRAWINGS. The ENGINEER'S approval of any SHOP DRAWINGS shall not release the CONTRACTOR from responsibility for deviations from the requirements specified in the CONTRACT DOCUMENTS. The approval of any SHOP DRAWING, which substantially deviates from the requirement of the CONTRACT DOCUMENTS, shall be evidenced by a CHANGE ORDER.

01000.5.2 When submitted for the ENGINEER'S review, SHOP DRAWINGS shall bear the CONTRACTOR'S certification that the CONTRACTOR has reviewed, checked and approved the SHOP DRAWINGS and that they are in conformance with the requirements of the CONTRACT DOCUMENTS.

01000.5.3 Portions of the WORK requiring a SHOP DRAWING or SAMPLE submission shall not begin until the SHOP DRAWING or SAMPLE submission has been approved by the ENGINEER. A copy of each approved SHOP DRAWING and each approved SAMPLE shall be kept in good order by the CONTRACTOR, at the site, and shall be available to the ENGINEER.

01000.6 MATERIALS, SERVICES AND FACILITIES

01000.6.1 It is understood that, except as otherwise specifically stated in the CONTRACT DOCUMENTS, the CONTRACTOR shall provide and pay for all materials, labor, tools, equipment, water, light, power, transportation, supervision, temporary construction of any nature, and all other services and facilities of any nature whatsoever necessary to execute, complete, and deliver the WORK within the specified time. The CONTRACTOR shall solely be responsible for making arrangements for suitable off-site storage, if required, of materials or equipment needed to

accomplish the WORK. Prior to using such area or facility, the CONTRACTOR shall obtain approval from the ENGINEER.

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- 01000.6.2 Materials and equipment shall be so stored as to insure the preservation of their quality and fitness for the WORK. Stored materials and equipment to be incorporated in the WORK shall be located so as to facilitate prompt inspection.
- 01000.6.3 Manufactured articles, materials and equipment shall be applied, installed, connected, erected, used, cleaned and conditioned as directed by the manufacturer.
- 01000.6.4 Materials, supplies, and equipment shall be in accordance with samples submitted by the CONTRACTOR and approved by the ENGINEER.
- 01000.6.5 Materials, supplies or equipment to be incorporated into the WORK shall not be purchased by the CONTRACTOR or the SUBCONTRACTOR subject to a chattel mortgage or under a conditional sale contract or other agreement by which an interest is retained by the seller or any third party financing entity.
- 01000.7 INSPECTION AND TESTING
- 01000.7.1 All materials and equipment used in the construction of the PROJECT shall be subject to adequate inspection and testing in accordance with generally accepted standards, as required and defined in the CONTRACT DOCUMENTS.
- 01000.7.2 The OWNER shall provide all inspection and testing services not indicated in the CONTRACT DOCUMENTS as being the CONTRACTOR'S responsibility.
- 01000.7.3 The CONTRACTOR shall provide at its expense any/all testing and inspection services required by the CONTRACT DOCUMENTS.
- 01000.7.4 If the CONTRACT DOCUMENTS, laws, ordinances, rules, regulation or orders of any public authority having jurisdiction require any WORK to specifically be inspected, tested, or approved by someone other than the CONTRACTOR, the CONTRACTOR will give the ENGINEER timely notice of readiness. The CONTRACTOR will then furnish the ENGINEER the required certificates of inspection, testing, or approval.
- 01000.7.5 Inspections, tests or approvals by the ENGINEER or others shall not relieve the CONTRACTOR from its obligations to perform the WORK in accordance with the requirements of the CONTRACT DOCUMENTS.
- 01000.7.6 The ENGINEER and the ENGINEER'S representatives will at all times have access to the WORK. In addition, authorized representatives and agents of any participating Federal or State agency shall be permitted to inspect all work, materials, payrolls, records of personnel, invoices of materials, and other relevant data and records. The CONTRACTOR will provide proper facilities for such access and observation of the WORK and also for any inspection, or testing thereof.
- 01000.7.7 If any WORK is backfilled or covered contrary to the written instructions of the ENGINEER it must, if requested by the ENGINEER, be uncovered for its observation and replaced at the CONTRACTOR'S expense.
- 01000.7.8 If the ENGINEER considers it necessary or advisable that previously approved covered WORK be inspected or tested by others, the CONTRACTOR, at the ENGINEER'S request, will uncover, expose or otherwise make available for observation, inspection or testing as the ENGINEER may

require, that portion of the WORK in question, furnishing all necessary labor, materials, tools, and equipment. If it is found that such WORK is defective, the CONTRACTOR will bear all the expenses of such uncovering, exposure, observation, inspection and testing and of satisfactory reconstruction. If, however, such WORK is not found to be defective, the CONTRACTOR will be allowed an increase in the CONTRACT PRICE or an extension of the CONTRACT TIME, or both, directly attributable to such uncovering, exposure, observation, inspection, testing and reconstruction and an appropriate CHANGE ORDER shall be issued.

01000.8

SUBSTITUTIONS

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01000.8.1

Whenever a material, article or piece of equipment is identified on the CONTRACT DRAWINGS or SPECIFICATIONS by reference to brand name or catalogue number, it shall be understood that the reference is made for the purpose of defining the performance or other salient requirements and that other products of equal capacities, quality and function may be considered. The CONTRACTOR may recommend the substitution of a material, article, or piece of equipment of equal substance and function for those referred to in the CONTRACT DOCUMENTS by reference to brand name or catalogue number, and if, in the opinion of the ENGINEER, such material, article, or piece of equipment is of equal substance and function to that specified, the ENGINEER may approve its substitution and use by the CONTRACTOR. Any cost reduction shall be deductible from the CONTRACT PRICE and the CONTRACT DOCUMENTS shall be appropriately modified by CHANGE ORDER. The CONTRACTOR warrants that if substitutes are approved, no major changes in the function or general design of the PROJECT will result. Incidental changes or extra component parts required to accommodate the substitute will be made by the CONTRACTOR without a change in the CONTRACT PRICE or CONTRACT TIME.

01000.9

PATENTS

The CONTRACTOR shall pay all applicable royalties and license fees. They shall defend all suits or claims for infringement of any patent rights and save the OWNER harmless from loss on account thereof, except that the OWNER shall be responsible for any such loss when a particular process, design, or the product of a particular manufacturer or manufacturers is specified, however if the CONTRACTOR has reason to believe that the design, process or product specified is an infringement of a patent, the CONTRACTOR shall be responsible for such loss unless the CONTRACTOR promptly gives such information to the ENGINEER.

01000.10

SURVEYS, PERMITS, AND REGULATIONS

01000.10.1

The OWNER shall furnish all boundary surveys and establish all base lines for locating the principal component parts of the WORK together with a suitable number of bench marks adjacent to the WORK as shown in the CONTRACT DOCUMENTS. From the information provided by the OWNER, unless otherwise specified in the CONTRACT DOCUMENTS, the CONTRACTOR shall develop and make all detail surveys needed for construction such as slope stakes, batter boards, stakes for pipe locations and other working points, lines elevations, and cut sheets from information provided by the ENGINEER.

01000.10.2

The CONTRACTOR shall carefully preserve benchmarks, reference points and stakes. If willful or careless destruction to these stakes, marks or reference points results from the activities of the CONTRACTOR, the CONTRACTOR shall be charged with the resulting expense for their restoration and for any mistakes that may be caused by their loss or disturbance.

01000.10.3

Permits and licenses of a temporary nature necessary for the prosecution of the WORK shall be secured and paid for the by the CONTRACTOR, unless otherwise stated in the SUPPLEMENTAL GENERAL CONDITIONS. Permits, licenses and easements for permanent structures or

permanent changes in existing facilities shall be secured and paid for by the OWNER, unless otherwise specified. The CONTRACTOR shall give all notices and comply with all laws, ordinances, rules and regulations bearing on the conduct of the WORK as drawn and specified. If the CONTRACTOR observes that the CONTRACT DOCUMENTS are at variance therewith, it shall promptly notify the ENGINEER in writing, and any necessary changes shall be adjusted as provided in Section 13, CHANGES IN THE WORK.

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01000.11 PROTECTION OF WORK, PROPERTY, AND PERSONS

01000.11.1 The CONTRACTOR will be responsible for initiating, maintaining and supervising all safety precautions and programs in connection with the WORK and shall comply with all OSHA, State and local requirements. This shall include taking all necessary precautions for the safety of, and will provide the necessary protection to prevent damage, injury or loss to:

- All employees on the WORK and other persons who may be affected thereby,
- All the WORK and all materials or equipment to be incorporated therein, whether in storage on or off the site, and
- Other property at the site or adjacent thereto, including trees, shrubs, lawns, walks, pavements, roadways, structures and utilities not designated for removal, relocation or replacement in the course of construction.

01000.11.2 The CONTRACTOR will comply with all applicable laws, ordinances, rules, regulations and orders of any public body having jurisdiction. The CONTRACTOR will erect and maintain, as required by the conditions and progress of the WORK, all necessary safeguards for safety and protection. The CONTRACTOR will notify owners of adjacent utilities when prosecution of the WORK may affect them. The CONTRACTOR will remedy all damage, injury or loss to any property, caused directly or indirectly, in whole or part, by the CONTRACTOR, any SUBCONTRACTOR or anyone directly or indirectly employed by any of them or anyone for whose acts any of them be liable, except damage or loss attributable to the fault of the CONTRACT DOCUMENTS or to the acts or omissions of the OWNER or the ENGINEER or anyone employed by either of them or anyone for whose acts either of them may be liable, and not attributable, directly or indirectly, in whole or in part, to the fault or negligence of the CONTRACTOR.

01000.11.3 In emergencies affecting the safety of persons or the WORK or property at the site or adjacent thereto, the CONTRACTOR, without special instruction or authorization from the ENGINEER or OWNER, shall act to prevent threatened damage, injury or loss. The CONTRACTOR will give the ENGINEER prompt WRITTEN NOTICE of any significant changes in the WORK or deviations from the CONTRACT DOCUMENTS caused thereby, and a CHANGE ORDER shall thereupon be issued covering the changes and deviations involved.

01000.11.4 The CONTRACTOR, solely, shall be responsible for the safety, efficiency, and adequacy of its equipment, materials and methods; and for any damage resulting from their failure or improper operation and maintenance.

01000.11.5 Unless otherwise allowed by these CONTRACT DOCUMENTS, the CONTRACTOR'S use of the WORK site shall be limited to its construction operations, including on-site storage of materials, on-site fabrication facilities and field offices.

01000.12 SUPERVISION BY CONTRACTOR

01000.12.1 The CONTRACTOR will supervise and direct the WORK and will be solely responsible for the means, methods, techniques, sequences, and procedures of construction. The CONTRACTOR

will employ and maintain on the WORK a qualified supervisor or superintendent who shall have been designated, in writing by the CONTRACTOR, as the CONTRACTOR'S REPRESENTATIVE at the site. The CONTRACTOR'S REPRESENTATIVE shall have full authority to act on behalf of the CONTRACTOR and all communications given to the CONTRACTOR'S REPRESENTATIVE shall be as binding as if given to the CONTRACTOR. The CONTRACTOR'S REPRESENTATIVE shall be present on the site at all times as required to perform adequate supervision and coordination of the WORK.

01000.12.2 The CONTRACTOR shall make its own investigation of the condition of available public roads and their clearances, restrictions and limitations which affect access to the WORK and shall further be responsible for construction and maintenance of any haul road required for accomplishment of the work.

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01000.12.3 Nothing herein shall be construed to entitle the CONTRACTOR to exclusive use of any public street, alleyway, or parking area during the performance of the WORK. The CONTRACTOR shall so conduct operations as to not interfere with the authorized work of utility companies or other entities so authorized within these areas.

01000.12.4 The CONTRACTOR shall not close any public street or roadway without obtaining permission from both the ENGINEER and the appropriate jurisdictional authority. When excavation is performed along a public street or roadway, access to fire hydrants, appropriate erosion protection measures and passage of traffic in at least one lane shall be provided at all times by the CONTRACTOR.

01000.13 CHANGES IN THE WORK

01000.13.1 The OWNER may at any time, as the need arises, institute change orders within the scope of the WORK. If such changes increase or decrease the amount due under the CONTRACT DOCUMENTS, or in the time required for performance of the WORK, an equitable adjustment shall be authorized by CHANGE ORDER.

01000.13.2 A CHANGE ORDER will be issued to decrease or increase actual quantities used which are different than those shown in the BID Schedule. All changes must be fully approved in writing on a CHANGE ORDER before they can be included in a payment to the CONTRACTOR. The Contract Change Order form will be used to document and authorize changes to the CONTRACT DOCUMENTS unless approval to use another form is obtained from the ENGINEER.

01000.13.3 The ENGINEER may, at any time, issue a FIELD ORDER, to interpret construction plans or to document communications with the CONTRACTOR concerning details of the WORK. The CONTRACTOR shall proceed with the performance of any changes in the WORK so ordered, in writing, by the ENGINEER. If the CONTRACTOR believes that such FIELD ORDER entitles them to a change in CONTRACT PRICE or TIME, or both, in which event it shall give the ENGINEER WRITTEN NOTICE thereof within seven (7) days after the receipt of the FIELD ORDER. Thereafter the CONTRACTOR shall document the justification and quantification for the change in CONTRACT PRICE and/or TIME within thirty (30) days. If the OWNER does not believe that a CHANGE ORDER is appropriate as detailed in 13.1 above, WRITTEN NOTICE of the same shall be provided to the CONTRACTOR within 30 days of the receipt of the CONTRACTOR'S documentation of the change in the CONTRACT price or time. Any dispute shall thereafter be resolved pursuant to the terms of these CONTRACT DOCUMENTS. Regardless of any dispute by and between the CONTRACTOR, ENGINEER and OWNER, CONTRACTOR shall perform all WORK required by the FIELD ORDER, CHANGE ORDER or other CONTRACT DOCUMENT contained herein, and maintain accurate records for all associated costs and time.

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01000.14 CHANGES IN CONTRACT PRICE

01000.14.1 The CONTRACT PRICE may be changed only by a CHANGE ORDER. The value of any WORK covered by a CHANGE ORDER or of any claim for increase or decrease in the CONTRACT PRICE shall be determined by one or more of the following methods, in the order of precedence listed below:

- Unit prices previously approved in the CONTRACT DOCUMENTS.
- An agreed lump sum price.
- The actual cost for labor, direct overhead, materials, supplies, equipment, and other services necessary to complete the work. In addition there shall be added an amount to be agreed upon but not to exceed fifteen (15) percent of the actual cost of the WORK to cover the cost of general overhead and profit.

01000.14.2 The OWNER reserves the right to adjust quantities listed in the Bid Schedule in order to revise the total CONTRACT PRICE, thereby matching funding available in the OWNER's budget.

01000.15 TIME FOR COMPLETION AND LIQUIDATED DAMAGES

01000.15.1 The date of beginning and the time for completion of the WORK, are essential conditions of the CONTRACT DOCUMENTS and the WORK embraced shall be commenced on the date specified in the NOTICE TO PROCEED.

01000.15.2 The CONTRACTOR will proceed with the WORK at such rate of progress to insure full completion within the CONTRACT TIME. It is expressly understood and agreed, by and between the CONTRACTOR and the OWNER, that the CONTRACT TIME for the completion of the WORK described herein is a reasonable time, taking into consideration the average climatic and economic conditions and other factors prevailing in the locality of the WORK.

01000.15.3 If the CONTRACTOR fails to complete the WORK within the CONTRACT TIME, including any applicable extension of time granted by the OWNER, the CONTRACTOR shall pay liquidated damages to the OWNER. The amount for liquidated damages for each calendar day that the CONTRACTOR is in default will be as stipulated in the CONTRACT DOCUMENTS.

01000.15.4 The CONTRACTOR shall not be charged with liquidated damages or any excess cost when the delay in completion of the WORK is due to the following, and the CONTRACTOR has promptly given WRITTEN NOTICE of such delay to the OWNER or ENGINEER:

- To any preference, priority or allocation order duly issued by the OWNER, or
- To unforeseeable causes beyond the control and without the fault or negligence of the CONTRACTOR, including but not restricted to, acts of God, or of the public enemy, acts of the OWNER, acts of an other CONTRACTOR in the performance of a contract with the OWNER, fires, floods, epidemics, quarantine restrictions, strikes, freight embargoes, and abnormal and unforeseeable weather; or
- To any delays of SUBCONTRACTORS occasioned by any of the causes specified in the preceding two paragraphs.

01000.16 CORRECTION OF WORK

01000.16.1 The CONTRACTOR shall promptly remove from the premises all non-conforming WORK rejected by the ENGINEER, whether incorporated in the construction or not, and the CONTRACTOR shall promptly replace and re-execute the WORK in accordance with the

CONTRACT DOCUMENTS, without expense to the OWNER and shall also bear the expense of making good all WORK of other CONTRACTORS destroyed or damaged by such removal or replacement.

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01000.16.2 All removal and replacement WORK shall be done at the CONTRACTOR'S expense. If the CONTRACTOR does not take action to remove such rejected WORK within ten (10) days after receipt of WRITTEN NOTICE, the OWNER may remove or have removed such WORK and all associated costs will be to the expense of the CONTRACTOR.

01000.17 SUBSURFACE CONDITIONS

01000.17.1 During the progress of the WORK, if subsurface or latent physical conditions are encountered at the site which differ materially from those indicated in the CONTRACT DOCUMENTS, or if unknown physical conditions of an unusual nature, differing materially from those ordinarily encountered and generally recognized as inherent in the WORK provided for in the CONTRACT DOCUMENTS, are encountered at the site, the party discovering such conditions shall promptly notify the OWNER verbally, followed immediately by a WRITTEN NOTICE of the specifically differing conditions, before the site is further disturbed and before the affected WORK is performed.

01000.17.2 The OWNER shall promptly investigate the conditions, and if found that such conditions materially differ and therefore causes an increase or decrease in the cost and/or the time required for performance of the WORK, an equitable adjustment shall be made and the CONTRACT DOCUMENTS shall be modified by a CHANGE ORDER. Any claim of the CONTRACTOR for adjustment hereunder shall not be allowed unless the required WRITTEN NOTICE has been given; provided that the OWNER may, if it determines the facts so justify, consider and adjust any such claims asserted before the date of final payment.

01000.18 SUSPENSION OF WORK AND TERMINATION OF CONTRACT

01000.18.1 SUSPENSION OF WORK - At any time and without cause, OWNER may suspend the WORK or any portion thereof for a period of not more than 90 consecutive days by notice in writing to CONTRACTOR and ENGINEER, which will fix the date on which WORK will be resumed. CONTRACTOR shall resume the WORK on the date so fixed. CONTRACTOR shall be allowed an adjustment in the Contract Price or an extension of the Contract Time, or both, directly attributable to any such suspension if CONTRACTOR makes a Claim therefor as provided in Subsection 00700.30.

01000.18.2 TERMINATION OF CONTRACT FOR CAUSE - The OWNER may terminate the contract for cause as a result of the occurrence of any one or more of the following circumstances:

- CONTRACTOR's persistent failure to perform the WORK in accordance with the Contract Documents (including, but not limited to, failure to supply sufficient skilled workers or suitable materials or equipment or failure to adhere to the progress and payment schedule established under Subsection 00700.3.3.
- CONTRACTOR's disregard of Laws or Regulations of any public body having jurisdiction;
- CONTRACTOR's disregard of the authority of ENGINEER; or
- CONTRACTOR's violation in any substantial way of any provisions of the Contract Documents.

If one or more of the events described in the foregoing list occur, OWNER may, after giving CONTRACTOR (and the surety, if any) seven days written notice, terminate the services of CONTRACTOR, exclude CONTRACTOR from the Site and take possession of the WORK and of all CONTRACTOR's tools, appliances, construction equipment and machinery at the Site and use the same to the full extent they could be used by CONTRACTOR (without liability to CONTRACTOR for trespass or conversion), incorporate in the WORK all materials and equipment stored at the Site or for which OWNER has paid CONTRACTOR but which are stored elsewhere, and finish the WORK as OWNER may deem expedient.

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In such case, CONTRACTOR shall not be entitled to receive any further payment until the WORK is finished. If the unpaid balance of the Contract Price exceeds all claims, costs, losses and damages (including, but not limited to all fees and charges of engineers, architects, attorneys and other professionals and all court or arbitration or other dispute resolution costs) sustained by OWNER arising out of or relating to completing the WORK, such excess will be paid to CONTRACTOR. If such claims, costs, losses and damages exceed such unpaid balance, CONTRACTOR shall pay the difference to OWNER. The ENGINEER shall review such claims, costs, losses and damages incurred by OWNER for reasonableness and, when approved by the ENGINEER, they shall be incorporated into the CONTRACT as a Change Order. When exercising any rights or remedies under this paragraph, OWNER shall not be required to obtain the lowest price for the WORK performed.

Where CONTRACTOR's services have been so terminated by OWNER, the termination will not affect any rights or remedies of OWNER against CONTRACTOR then existing or which may thereafter accrue. Any retention or payment of moneys due CONTRACTOR by OWNER will not release CONTRACTOR from liability.

01000.18.3

TERMINATION OF CONTRACT FOR CONVENIENCE - The OWNER, for his/her convenience, and without cause and without prejudice to any other right or remedy of OWNER, may terminate the CONTRACT by giving seven days written notice to CONTRACTOR and to ENGINEER. In such case, CONTRACTOR shall be paid (without duplication of any item) as follows:

- For completed and acceptable WORK executed in accordance with the Contract Documents prior to the effective date of termination, including fair and reasonable sums for overhead and profit on such WORK;
- For expenses sustained prior to the effective date of termination in performing services and furnishing labor, materials or equipment as required by the Contract Documents in connection with uncompleted WORK, plus fair and reasonable sums for overhead and profit on such expenses;
- For all claims, costs, losses and damages (including, but not limited to all fees and charges of engineers, architects, attorneys and other professionals and all court or arbitration or other dispute resolution costs) incurred in settlement of terminated contracts with Subcontractors, Suppliers and others; and
- For reasonable expenses directly attributable to termination.

The CONTRACTOR shall not be paid on account of loss of anticipated profits or revenue or other economic loss arising out of or resulting from such termination.

01000.18.4

SUSPENSION OF WORK BY CONTRACTOR - When either of the following conditions exist:

- The ENGINEER has failed to act on an Application for Payment within 30 days after it is submitted, or

- The OWNER has failed for 30 days to pay CONTRACTOR any sum finally determined to be due.

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The CONTRACTOR, without prejudice to any other right or remedy, may, upon giving seven days written notice to OWNER and to ENGINEER, suspend the WORK until payment is made of all such amounts due CONTRACTOR, including interest thereon. In this regard, the provisions of Subsection 00700.15.4 are not intended to preclude CONTRACTOR from making a Claim under Paragraph 10.05 for an adjustment in Contract Price or Contract Time or otherwise for expenses or damage directly attributable to CONTRACTOR's stopping the WORK as permitted by this paragraph.

01000.18.5 TERMINATION OF CONTRACT BY CONTRACTOR - If, through no act or fault of CONTRACTOR, the WORK is suspended:

- For more than 90 consecutive days by OWNER, or
- Because of an order of a court or other public authority, or
- The ENGINEER fails to act on any Application for Payment within 30 days after it is submitted, or
- OWNER fails for 30 days to pay CONTRACTOR any sum finally determined to be due, then

CONTRACTOR may, upon seven days written notice to OWNER and to ENGINEER, and provided OWNER or ENGINEER do not remedy such suspension or failure within that time, terminate the Contract and recover from OWNER payment on the same terms as provided in Subsection 00700.18.3;

01000.19 PAYMENTS TO THE CONTRACTOR

01000.19.1 APPLICATION FOR PAYMENT

01000.19.1.1 SUBMISSION OF APPLICATION - On or before the 10th day of each month, or as otherwise agreed, the CONTRACTOR will submit to the ENGINEER an Application for Payment for the work done in the previous month. The application shall be filled out and signed by the CONTRACTOR and be supported by such data as the ENGINEER may reasonably require.

The Application for Payment may include an allowance for the cost of major materials and equipment which have been delivered and suitably stored at or near the work site but have not yet been incorporated into the work. If payment is requested on this basis, the Application for Payment shall also be accompanied by such supporting data, satisfactory to the OWNER, as will establish the OWNER'S title to the material and equipment and protect its interest therein, including proof of full coverage under applicable insurance. See Subsection 00700.21.4.5.

01000.19.1.2 ENGINEER'S APPROVAL - The ENGINEER will, within seven (7) days following receipt of each Application for Payment, review and either approve or reject the application. The ENGINEER will indicate approval in writing and present the request for payment to the OWNER or TRUSTEE as applicable. If the application is rejected, the ENGINEER will return the application to the CONTRACTOR indicating in writing the reasons for rejection. In the latter case, the CONTRACTOR may make necessary corrections or revisions and resubmit the Application for Payment.

01000.19.1.3 PAYMENT BY OWNER - The OWNER or TRUSTEE will, within thirty (30) days of presentation of an approved Application for Payment, pay the CONTRACTOR a progress payment on the

basis of the Application. The OWNER shall deduct, retain and administer the retainage amounts of each payment in accordance with provisions of applicable state and local laws. Unless otherwise specified in the Construction Contract Agreement or in the Special Provisions, amounts deducted, retained, administered and paid shall be as described below:

- As directed by the ENGINEER, the OWNER shall deduct and retain up to ten (10) percent of the amount of each payment until there has been ninety-five (95) percent completion and acceptance of all WORK covered by the CONTRACT DOCUMENTS.
- When not less than ninety-five (95) percent of the WORK has been completed, the ENGINEER may reduce the amount of retainage to one and one-half percent of the original CONTRACT PRICE to ensure completion.
- Upon completion and acceptance of a part of the WORK on which the price is stated separately in the CONTRACT DOCUMENTS, payment may be made in full, including retained percentages, less authorized deductions.

01000.19.2

NON-PAYMENT BY OWNER

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Unless otherwise specified in the CONSTRUCTION CONTRACT AGREEMENT or in the SPECIAL PROVISIONS, if the OWNER fails to make payment thirty (30) days after approval by the ENGINEER, in addition to other remedies available to the CONTRACTOR, there shall be added to each such payment interest at the maximum legal rate commencing on the first day after said payment is due and continuing until the payment is received by the CONTRACTOR.

01000.19.3

WITHOLDING OF PAYMENT BY OWNER

01000.19.3.1

As a result of subsequently discovered evidence, the OWNER may, after consultation with the ENGINEER, withhold or nullify the whole or part of any payment application as may be necessary to protect the OWNER from loss for:

- Defective work not remedied
- Claims filed
- Failure of the CONTRACTOR to make payments properly to SUBCONTRACTORS or SUPPLIERS.
- Damage to other CONTRACTORS
- Performance of WORK in violation of the terms of the CONTRACT DOCUMENTS.

In the event this situation arises where the WORK is SUBSTANTIALLY COMPLETE but lacks testing, cleanup and/or corrections, quantities may be reduced proportionately in the payment to cover such testing, cleanup and/or corrections.

When the deficiencies of the contract terms contributing to this action are corrected, payment will be made for amounts due in full.

00700.19.3.2

CONTINUED NON-PERFORMANCE - In the instance of continued non-performance or non-compliance on the part of the CONTRACTOR in making remedies or corrections to deficiencies in the WORK, the OWNER may himself, or with the help of another contractor or hired worker, perform the work necessary to bring about the required corrections and/or remedies. All additional incurred costs of such work, including both labor and materials, will be withheld from payments otherwise due to the CONTRACTOR until the situation has been resolved.

01000.19.4

INDEMNIFICATION

- 01000.19.4.1 The CONTRACTOR shall indemnify and save the OWNER or the OWNER'S agents harmless from all claims growing out of the lawful demands of SUBCONTRACTORS, laborers, workmen, mechanics, material men, and furnishers of machinery and parts thereof, equipment, tools, and all supplies, incurred in the furtherance of the performance of the WORK. The CONTRACTOR shall, at the OWNER'S request, furnish satisfactory evidence that all obligations of the nature designated above have been paid, discharged, or waived. If the CONTRACTOR fails to do so, the OWNER may, after having notified the CONTRACTOR, pay unpaid bills or withhold from the CONTRACTOR'S unpaid compensation a sum of money deemed reasonably sufficient to pay any and all such lawful claims until satisfactory evidence is furnished that all liabilities have been fully discharged whereupon payment to the CONTRACTOR shall be resumed, in accordance with the terms of the CONTRACT DOCUMENTS, but in no event shall the provisions of this sentence be construed to impose upon the OWNER any obligations to either the CONTRACTOR, the CONTRACTOR'S Surety, or any third party. In paying any unpaid bills of the CONTRACTOR, any payment so made by the OWNER shall be considered as a payment made under the CONTRACT DOCUMENTS by the OWNER to the CONTRACTOR and the OWNER shall not be liable to the CONTRACTOR for any such payments made in good faith
- 01000.19.5 FINAL PAYMENT ON COMPLETION OF WORK
- Upon completion and acceptance of the WORK, the ENGINEER shall issue a certificate, attached to the final Application for Payment, that the WORK has been accepted under the conditions of the CONTRACT DOCUMENTS. The entire balance found to be due the CONTRACTOR, including the retained percentages, but except such sums as may be lawfully retained by the OWNER, shall be paid to the CONTRACTOR within sixty (60) days (or per state law) of completion and acceptance of the WORK.
- 01000.19.6 ACCESS TO PREMISES AND FACILITIES
- 01000.19.6.1 USE OF COMPLETED WORK - At any time, the OWNER may, with the approval of the ENGINEER and with the concurrence of the CONTRACTOR, use any completed or substantially completed portions of the WORK. Such use shall be authorized by issuance of a Notice of Substantial Completion and shall not constitute an acceptance of such portions of the WORK.
- 01000.19.6.2 NON-CONTRACT WORK - The OWNER shall have the right to enter the premises for the purpose of doing work not covered by the CONTRACT DOCUMENTS. This provision shall not be construed as relieving the CONTRACTOR of the sole responsibility for the care and protection of the WORK, or the restoration of any damaged WORK except such as may be caused by agents or employees of the OWNER.
- 01000.20 ACCEPTANCE OF FINAL PAYMENT AS RELEASE
- 01000.20.1 The acceptance by the CONTRACTOR of final payment shall be and shall operate as a release to the OWNER of all claims and all liability to the CONTRACTOR, other than claims in stated amounts as may be specifically excepted by the CONTRACTOR for all things done or furnished in connection with this WORK, and for every act and neglect of the OWNER and other relating to or arising out of this WORK. Any payment, however, final or otherwise, shall not release the CONTRACTOR or its sureties from any obligations under the CONTRACT DOCUMENTS or the Performance BOND and Payment BOND.
- 01000.21 INSURANCE
- 01000.21.1 PURCHASE OF INSURANCE - The CONTRACTOR shall purchase insurance to protect against liability, loss, or other expense arising from damage to property or injury to or death of any person

or persons incurred in anyway out of, in connection with, or resulting from the work provided hereunder. The CONTRACTOR shall purchase the insurance from reliable insurance companies authorized to do business in the state in which the work is to be performed. The insurance shall be rated "A" or better and have a financial size category of Class VII or larger as determined by A.M. Best Company at the time the CONTRACT DOCUMENTS are executed.

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01000.21.2 CERTIFICATE OF INSURANCE - Certificates of Insurance acceptable to the OWNER shall be filed with the OWNER prior to commencement of the WORK. Such Certificates shall identify the OWNER and ENGINEER (and any other party identified in the Supplemental General Conditions) as additional insured. These Certificates shall contain a provision that coverage afforded under the policies will not be materially changed or reduced unless at least thirty (30) days prior WRITTEN NOTICE has been given to the OWNER.

01000.21.3 COVERAGE OF INSURANCE - Insurance purchased by the CONTRACTOR shall provide protection against claims including, but not limited to, those set forth below, which may arise out of, or resulting from, the CONTRACTOR'S execution of the WORK, whether such execution be by the CONTRACTOR or by any SUBCONTRACTOR or by any other person directly or indirectly employed by any of them, or by anyone for whose acts any of them may be liable:

- Claims under workmen's compensation, disability benefit and other similar employee benefit acts;
- Claims for damages because of bodily injury, occupational sickness or disease, or death of its employees;
- Claims for damages because of bodily injury, sickness or disease or death of any person other than its employees;
- Claims for damages insured by usual personal injury liability coverage which are sustained (1) by any person as a result of an offense directly or indirectly related to the employment of such person by the CONTRACTOR, or (2) by any other person; and
- Claims for damages because of injury to or destruction of tangible property, including loss of use resulting therefrom.

01000.21.4 REQUIRED INSURANCE

The required insurance shall be the following or equivalent, where each applies:

01000.21.4.1 WORKERS COMPENSATION - Workers Compensation Insurance and Employer's Liability Insurance that provide statutory benefits. The Best's rating requirements are waived for coverage provided by the Worker's Compensation Fund within the state in which the PROJECT is located. The CONTRACTOR shall require all SUBCONTRACTORS at any tier to take and maintain similar policies of Workers' Compensation Insurance.

01000.21.4.2 COMPREHENSIVE - Comprehensive General Liability Insurance and/or Commercial General Liability Insurance, including coverage for premises and operations, explosion, collapse and underground hazards, contractual (including this contract, and personal injury including employees) with limits of not less than \$1,000,000 combined single limit per occurrence, and not less than \$2,000,000 aggregate which shall be designated as applying to this contract. If this insurance is made on a "claims made" basis, the certificate of insurance required above shall indicate, and the policy shall contain, an extended reporting period provision or similar "tail" provision such that claims reported up to one (1) year beyond the date of completion of this contract are covered.

01000.21.4.3 AUTOMOBILE - Comprehensive Automobile Liability insurance including owned, hired, and non-owned automobiles with limits not less than \$1,000,000 combined single limit per accident.

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01000.21.4.4 AIRCRAFT - The CONTRACTOR using its own aircraft, or employing aircraft in connection with the work performed under these CONTRACT DOCUMENTS shall maintain Aircraft Liability Insurance with a combined single amount of not less than \$1,000,000 per occurrence.

01000.21.4.5 PROPERTY - Unless otherwise provided, the CONTRACTOR shall purchase property insurance in an amount equal to the initial CONTRACT PRICE plus any subsequent modifications thereto for the entire WORK of the PROJECT on a replacement cost basis with any applicable deductibles not to exceed \$5,000

Property insurance shall be on an all-risk form. It shall provide extended coverage and shall insure against the perils of fire and physical loss or damage including, without duplication of coverage, flood, earth movement, theft, vandalism, malicious mischief, collapse, falsework, temporary buildings, and debris removal including demolition occasioned by enforcement of any applicable requirements. It shall include reasonable compensation for ENGINEER'S services required as a result of such insured loss. Coverage for other perils shall not be required unless otherwise called for in the CONTRACT DOCUMENTS.

Such property insurance shall be maintained, unless otherwise provided in the CONTRACT DOCUMENTS, or otherwise agreed to in writing by all persons and entities who are beneficiaries of such insurance, until final payment has been made or until no person or entity other than the OWNER has an insurable interest in the WORK to be covered. This insurance shall include interests of the OWNER, the CONTRACTOR, and SUBCONTRACTORS in the WORK. The form of this policy for this coverage shall be Completed Value. If the OWNER is damaged by the failure of the CONTRACTOR to maintain such insurance, then the CONTRACTOR shall bear all reasonable costs properly attributed thereto.

Unless otherwise provided in the CONTRACT DOCUMENTS, and with written approval of the OWNER, this property insurance shall cover portions of the WORK stored off the site, at the value established in the approval, as well as portions of the WORK in transit.

01000.21.5 MAINTENANCE OF INSURANCE

Unless otherwise provided, all required insurance shall remain in force during the entire CONTRACT TIME.

01000.21.6 ARRANGEMENT OF POLICIES

Any policy required by this section may be arranged under a single policy for the full limit required, or by a combination of underlying policies with the balance provided by an Excess or Umbrella Liability Policy

01000.21.7 ADDITIONAL INSURED

All liability insurance policies required hereunder shall provide that the OWNER, ENGINEER and all departments, authorities and instrumentalities, and while acting within the scope of its duties, all of its elected or appointed officers, employees and authorized volunteers as well as advisory committees, shall be named as additional insured. Such policies shall also provide that coverage for the above insured is primary and not contributing

01000.21.8 INSOLVENCY OF INSURER - Irrespective of the requirements as to insurance to be carried by the CONTRACTOR as provided herein; insolvency, bankruptcy or failure of any insurance

company to pay all claims accruing, shall not be held to relieve the CONTRACTOR of any obligations hereunder.

01000.22 CONTRACT SECURITY

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01000.22.1 The CONTRACTOR shall within ten (10) days after the receipt of the NOTICE OF AWARD furnish the OWNER with a PERFORMANCE BOND and a PAYMENT BOND in penal sums equal to the amount of the CONTRACT PRICE, conditioned upon the performance by the CONTRACTOR of all undertakings, covenants, terms, conditions, and agreements of the CONTRACT DOCUMENTS, and upon the prompt payment by the CONTRACTOR to all persons supplying labor and materials in the prosecution of the WORK provided by the CONTRACT DOCUMENTS. Such BONDS shall be executed by the CONTRACTOR and a corporate bonding company licensed to transact such business in the state in which the WORK is to be performed and named on the current list of "Surety Companies Acceptable on Federal Bonds" as published in the Treasury Department Circular Number 570. The expense of these BONDS shall be borne by the CONTRACTOR. If at any time a surety on any such BOND is declared a bankrupt or loses its right to do business in the state in which the WORK is to be performed or is removed from the list of Surety Companies accepted on Federal bonds, CONTRACTOR shall within ten (10) days after notice from the OWNER to do so, substitute an acceptable BOND (or BONDS) in such form and sum and signed by such other surety or sureties as may be satisfactory to the OWNER. The premiums on such BOND shall be paid by the CONTRACTOR. No further payments shall be deemed due nor shall be made until the new surety or sureties shall have furnished an acceptable BOND to the OWNER.

01000.23 ASSIGNMENTS

01000.23.1 Neither the CONTRACTOR nor the OWNER shall sell, transfer, assign, or otherwise dispose of the CONTRACT or any portion thereof, or of its right, title, or interest therein, or its obligations thereunder, without written consent of the other party.

01000.24 INDEMNIFICATION

01000.24.1 In addition to indemnification provisions of the CONTRACT, the CONTRACTOR will indemnify and hold harmless the OWNER and the ENGINEER and its agents and employees from and against all claims, damages, losses and expenses including attorney's fees arising out of or resulting from the performance of the WORK, provided that any such claims, damage, loss or expense is attributable to bodily injury, sickness, disease or death, or to injury to or destruction of tangible property including the loss of use resulting therefrom; and is caused in whole or in part by any negligent or willful act or omission of the CONTRACTOR, and SUBCONTRACTOR or supplier, anyone directly or indirectly employed by any of them or anyone for whose acts any of them may be liable.

01000.24.2 In any and all claims against the OWNER or the ENGINEER, or any of its agents or employees, by any employee of the CONTRACTOR, any SUBCONTRACTOR, anyone directly or indirectly employed by any of them or anyone for whose acts any of them may be liable, the indemnification obligation shall not be limited in any way by any limitation on the amount or type of damages, compensation or benefits payable by or for the CONTRACTOR or any SUBCONTRACTOR under workmen's compensation acts, disability benefit acts or other employee benefits acts.

01000.24.3 The obligation of the CONTRACTOR under this paragraph shall not extend to the liability of the ENGINEER, its agents or employees arising out of the preparation or approval of maps, DRAWINGS, opinions, reports, surveys, CHANGE ORDERS, designs or SPECIFICATIONS.

- 01000.25 **SEPARATE CONTRACTS** ENT 102458:2000 PG 183 of 480
- 01000.25.1 The OWNER reserves the right to let other contracts in connection with this PROJECT. The CONTRACTOR shall afford other CONTRACTORS reasonable opportunity for the introduction and storage of its materials and the execution of its WORK, and shall properly connect and coordinate the WORK with theirs. If the proper execution or results of any part of the CONTRACTOR'S WORK depends upon the WORK of any other CONTRACTOR, the CONTRACTOR shall inspect and promptly report to the ENGINEER any defects in such WORK that render it unsuitable for such proper execution and results.
- 01000.25.2 The OWNER may perform additional WORK related to the PROJECT, or the OWNER, may let other contracts containing provisions similar to these. The CONTRACTOR will afford the other CONTRACTORS who are parties to such Contracts (or the OWNER, if the OWNER is performing the additional WORK), reasonable opportunity for the introduction and storage of materials and equipment and the execution of WORK, and shall properly connect and coordinate the CONTRACTOR'S WORK with theirs.
- 01000.25.3 If the performance of additional WORK by other CONTRACTOR(s) or the OWNER is not noted in the CONTRACT DOCUMENTS prior to the execution of the CONTRACT, written notice thereof shall be given to the CONTRACTOR prior to starting any such additional WORK. If the CONTRACTOR believes that the performance of such additional WORK by the OWNER or others involves the CONTRACTOR in additional expense or entitles it to an extension of the CONTRACT TIME, the CONTRACTOR may make a claim therefor as provided in Sections 14 and 15 of these General Conditions.
- 01000.26 **SUBCONTRACTING**
- 01000.26.1 The CONTRACTOR may utilize the services of specialty SUBCONTRACTORS on those parts of the WORK, which, under normal contracting practices, are performed by specialty SUBCONTRACTORS.
- 01000.26.2 The CONTRACTOR shall not award WORK to SUBCONTRACTOR(s), in excess of fifty (50%) percent of the CONTRACT PRICE, without prior written approval of the OWNER.
- 01000.26.3 The CONTRACTOR shall be as fully responsible to the OWNER for the acts and omissions of its SUBCONTRACTORS and suppliers, and of persons either directly or indirectly employed by them, as the CONTRACTOR is for the acts and omissions of persons directly employed by itself.
- 01000.26.4 The CONTRACTOR shall cause appropriate provisions to be inserted in all subcontracts relative to the WORK, to bind SUBCONTRACTORS to the CONTRACTOR by the terms of the CONTRACT DOCUMENTS, insofar as applicable to the WORK of SUBCONTRACTORS and to give the CONTRACTOR the same power as regards terminating any subcontract that the OWNER may exercise over the CONTRACTOR, under any provision of the CONTRACT DOCUMENTS.
- 01000.26.5 Nothing contained in this CONTRACT shall create any contractual relation between any SUBCONTRACTOR or supplier and the OWNER.
- 01000.27 **ENGINEER'S AUTHORITY**
- 01000.27.1 The ENGINEER shall act as the OWNER'S representative during the construction period and shall decide questions which may arise as to quality and acceptability of materials furnished and

WORK performed. The ENGINEER shall interpret the intent of the CONTRACT DOCUMENTS in a fair and unbiased manner. The ENGINEER will make visits to the site and determine if the WORK is proceeding in accordance with the CONTRACT DOCUMENTS.

01000.27.2 The ENGINEER will not be responsible for the construction means, controls, techniques, sequences, procedures, or construction safety. ENT 102458:2000 PG 184 of 480

01000.27.3 The ENGINEER shall promptly make decisions relative to interpretation of the CONTRACT DOCUMENTS.

01000.27.4 The ENGINEER will carefully enforce the intent of the CONTRACT DOCUMENTS in regard to the quality of materials, workmanship and execution of the WORK. Inspections may be made at the factory or fabrication plant of the source of material supply, when determined necessary by the ENGINEER.

10000.28 LAND AND RIGHTS-OF-WAY

01000.28.1 Prior to issuance of NOTICE TO PROCEED, the OWNER shall obtain all land and rights-of-way necessary for carrying out and for the completion of the WORK to be performed pursuant to the CONTRACT DOCUMENTS, unless otherwise mutually agreed.

01000.28.2 The OWNER shall provide information to the CONTRACTOR, which delineates and describes the lands owned and rights-of-way acquired.

01000.28.3 The CONTRACTOR shall provide at its own expense and without liability to the OWNER any additional land and access thereto that the CONTRACTOR may desire for temporary construction facilities or for storage of materials.

01000.29 GUARANTEE

01000.29.1 The CONTRACTOR shall guarantee all materials and equipment furnished and WORK performed for a period of one (1) year from the date of SUBSTANTIAL COMPLETION or FINAL ACCEPTANCE. The CONTRACTOR warrants and guarantees for a period of one (1) year from the date of SUBSTANTIAL COMPLETION or FINAL ACCEPTANCE of the WORK that the completed WORK is free from all defects due to faulty materials or workmanship and the CONTRACTOR shall promptly make such corrections as may be necessary by reason of such defects including the repairs of any damage to other parts of the WORK resulting from such defects. The OWNER will give notice of observed defects with reasonable promptness. In the event that the CONTRACTOR should fail to make such repairs, adjustments, or other WORK that may be made necessary by such defects, the OWNER may do so and charge the CONTRACTOR the cost thereby incurred. The Performance BOND shall remain in full force and effect through the guarantee period.

01000.30 ARBITRATION

01000.30.1 All claims, disputes, and other matters in question arising out of, or relating to, the CONTRACT DOCUMENTS or the breach thereof, except for claims which have been waived by making an acceptance of final payment as provided by Section 20 of these General Conditions, may be decided by arbitration if the parties mutually agree. Any agreement to arbitrate shall be

specifically enforceable under the prevailing arbitration law. The award rendered by the arbitrators shall be final, and judgment may be entered into any court having jurisdiction thereof.

01000.30.2 Notice of the request for arbitration shall be filed in writing with the other party to the CONTRACT DOCUMENTS and a copy shall be filed with the ENGINEER. Request for arbitration shall in no event be made on any claim, dispute, or other matter in question which would be barred by the applicable statute of limitations.

01000.30.3 The CONTRACTOR will carry on the WORK and maintain the progress schedule during any arbitration proceedings, unless otherwise mutually agreed in writing.

01000.31 TAXES

01000.31.1 The CONTRACTOR will pay all sales, consumer, use and other similar taxes required by the law of the place where the WORK is performed.

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01090.1

DESCRIPTION

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Wherever in these Specifications references are made to the standards, specifications, or other published data of the various national, regional, or local organizations, such organizations may be referred to by their acronyms or abbreviations only. As a guide to the user of these Specifications, the following acronyms or abbreviations, which may appear herein, shall have the meanings indicated below.

01090.1.1

DEFINITIONS OF ABBREVIATIONS AND ACRONYMS

AAR	Association of American Railroads
AASHTO	American Association of the State Highway and Transportation Officials
ACI	American Concrete Institute
AGA	American Gas Association
AGC	Associated General Contractors
AGMA	American Gear Manufacturers Association
AI	The Asphalt Institute
AIA	American Institute of Architects
AISC	American Institute of Steel Construction
AISI	American Iron and Steel Institute
ANSI	American National Standards Institute, Inc.
APWA	American Public Works Association
ASCE	American Society of Civil Engineers
ASHRAE	American Society of Heating, Refrigerating, and Air-Conditioning Engineers
ASME	American Society of Mechanical Engineers
ASQC	American Society of Quality Control
ASSE	American Society of Sanitary Engineers
ASTM	American Society for Testing and Materials
AWS	American Welding Society
AWWA	American Water Works Association
BLM	Bureau of Land Management (U.S. Department of Interior)
CEMA	Conveyor Equipment Manufacturer's Association
CGA	Compressed Gas Association
CFR	Code of Federal Regulations
CLFMI	Chain Link Fence Manufacturer's Institute
CMA	Concrete Masonry Association
DIP	Ductile Iron Pipe
EIA	Electronic Industries Association
EPA	U. S. Environmental Protection Agency
ETL	Electrical Test Laboratories
FEMA	Federal Emergency Management Administration
FERC	Federal Energy Regulatory Commission
FS	Forest Service (U.S. Department of Agriculture)
FWS	Fish and Wildlife Service
GI	Galvanized Iron
ICBO	International Conference of Building Officials
ID	Inside Diameter
IEEE	Institute of Electrical and Electronics Engineers
IES	Illuminating Engineering Society
IME	Institute of Makers of Explosives
ISA	Instrument Society of America
ISO	International Organization for Standardization
MBMA	Metal Building Manufacturer's Association
NACE	National Association of Corrosion Engineers

NBS	National Bureau of Standards	ENT 102458:2000 PG 187 of 400
NEC	National Electrical Code	
NEMA	National Electrical Manufacturer's Association	
NFPA	National Fire Protection Association	
NFPA	National Forest Products Association	
NRCS	Natural Resources Conservation Service (U.S. Department of Agriculture) (formerly SCS)	
OD	Outside Diameter	
OSHA	Occupational Safety and Health Administration	
PCA	Portland Cement Association	
PE	Polyethylene	
PVC	Polyvinyl Chloride	
RWMA	Resistance Welder Manufacturer's Association	
SAE	Society of Automotive Engineers	
SSPWC	Standard Specification for Public Works Construction	
UBC	Uniform Building Code	
UL	Underwriters Laboratories, Inc.	
UPRR	Union Pacific Railroad	
USDARD	Rural Development (U.S. Department of Agriculture) (formerly Farmers Home Administration)	
WCRSI	Western Concrete Reinforcing Steel Institute	
WRI	Wire Reinforcement Institute, Inc.	
WWPA	Western Wood Products Association	

01090.2 REFERENCED WORKS, CODES AND STANDARDS

Whenever references to specifications, codes, standards and other publications are made to these Specifications, the following rules shall apply:

01090.2.1 TITLES OF SECTIONS AND PARAGRAPHS

Titles of sections and/or paragraphs shown in these Specifications are for convenience of reference only, and do not form a part of the Specification.

01090.2.2 APPLICABLE PUBLICATIONS

Whenever references in these specifications are made to published specifications, codes, standards, or other requirements, it shall be understood that unless a date is specified, only the latest edition of these specifications, codes, and/or standards which have been published as of the date that the work is advertised for bids, shall apply; except to the extent that said standards or requirements may be in conflict with applicable laws, ordinances, or governing codes. No requirements set forth herein or shown on the Drawings shall be waived because of any provision of, or omission from, said standards or requirements.

01090.2.3 SPECIALISTS AND SPECIAL ASSIGNMENTS

In certain instances, specification text requires (or implies) that specific work is to be assigned to specialists or expert entities, who must be engaged for the performance of that work. Such direction shall be recognized as special requirements and is not intended to interfere with local union jurisdiction settlements and similar conventions. Such assignments are intended to establish which party or entity involved in a specific unit of work is recognized as "expert" and qualified for the assignment of the work. Nevertheless, the final responsibility for fulfilling this assignment remains with the Contractor.

01090.2.4 BUILDING CODES

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Reference herein to "Building Code" shall mean the Uniform Building Code issued by the International Conference of Building Officials (ICBO). The latest edition of the code as approved and used by the local agency as of the date of award, as adopted by the agency having jurisdiction, shall apply to the work herein, including all addenda, modifications, amendments, or other lawful changes thereto.

01090.2.5 OSHA

01090.2.5.1 OSHA REGULATIONS - References herein to "OSHA Regulations for Construction" shall mean Title 29, Part 1926, Construction Safety and Health Regulations, Code of Federal Regulations (OSHA), including all changes and amendments thereto

01090.2.5.2 OSHA STANDARDS - References herein to "OSHA Standards" shall mean Title 29, Part 1910, Occupational Safety and Health Standards of the U.S. Code of Federal Regulations, including all changes and amendments thereto.

01090.2.7 DOT STANDARDS/SPECIFICATIONS

References to "State DOT Specifications" or "State DOT Requirements" shall mean the Specifications for Excavation on State Highway Right-of-Way and/or Standard Specifications for Road and Bridge Construction, including all amendments thereto, issued by the State agency responsible for highways wherein the Contract is located and any other written requirements or provisions issued by that agency which are contained in these Contract Documents

01090.2.8 FEDERAL PIPELINE SAFETY STANDARDS

Reference to "Federal Pipeline Safety Standards" shall mean Title 29, Parts 191 and 192, Federal Pipeline Safety Minimum Standards, U.S. Code of Federal Regulations including all changes and amendments thereto.

01090.2.9 STATE GAS PIPELINE SAFETY STANDARDS

References to "State Gas Pipeline Safety Standards" shall mean the appropriate section/s of the legal code or regulations adopted in the State wherein the work is located, including all changes and amendments thereto.

01090.3 STANDARDS IMPOSED BY OTHER AGENCIES OR ORGANIZATIONS

01090.3.1 PROPERTY BELONGING TO OTHER AGENCIES OR ORGANIZATIONS

Construction may occur on property owned or administered by agencies or organizations other than the Owner, such as federal and/or state departments of transportation, the U. S. Forest Service, the U. S. Bureau of Land Management, the U.S. Fish and Wildlife, counties, canal companies, irrigation companies, utility companies, other federal and state agencies, municipal governments, etc. Work which is to take place on such property may be required to be in accordance with special construction requirements of that agency or organization as well as these specifications.

01090.3.2 ADDITIONAL INFORMATION AND SPECIFICATIONS

Information will be provided on the plans to indicate areas of the Work which fall on property owned or administered by agencies and organizations other than the Owner. Specifications from

agencies which are affected by the work will be provided in the Appendix to the Contract Documents. Those specifications provided in the Appendix shall be considered part of the Contract Documents and the Contractor shall include sufficient compensation in its bid to cover the work required for compliance thereto.

01090.4

CONFLICTS

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In case of conflict between codes, reference standards, Drawings and the other Contract Document, the most stringent requirements shall govern. All conflicts shall be brought to the attention of the Engineer for clarification and directions prior to ordering or providing any materials or labor required therefrom. The Contractor shall assume the most stringent requirements apply when preparing bids for this Contract.

01400.1 DESCRIPTION

This section covers quality control of all work and activities on the part of the City, the Engineer, and the Contractor, to ensure compliance with these Specifications and the requirements of the Contract.

01400.2 ASSIGNMENT OF RESPONSIBILITY

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01400.2.1 THE CONTRACTOR

The Contractor has primary responsibility for ensurance of quality control of the Work provided under the Contract. Therefore, any omission or failure on the part of the Engineer to notify the Contractor of, or to condemn defective work and/or materials at the time of construction shall not be taken as acceptance of the work or materials, and the Contractor will be required to correct any defective work or materials prior to final acceptance.

01400.2.2 THE CITY AND ENGINEER

The Engineer will endeavor to locate any errors or defective materials or workmanship, and call them to the attention of the Contractor prior to subsequent work being performed. However, the Engineer is under no obligation to do so, and neither the City, nor the Engineer shall be held liable for errors, or defective material, or defective workmanship performed by the Contractor and not discovered by the Engineer prior to subsequent work being performed.

01400.2.3 CORRECTIONS

Prior to execution of the Agreement, the Engineer may correct errors and omissions to these Contract Documents by issuing Addenda. After execution of the Agreement, correction of errors, omissions or other changes necessitated shall be made in accordance with the General Conditions (Section 00700).

01400.3 QUALITY OF MATERIALS

01400.3.1 COMPLIANCE WITH SPECIFICATIONS

All materials and equipment incorporated in the Work shall be of new manufacture and shall be of the grade and quality described by these Specifications and the Special Provisions.

01400.3.2 SPECIFIED MATERIALS

Where a specific brand or manufacturer's equipment, model, system, or etc. is specified in these Specifications, no intention is made to be exclusive or limit competition, but rather to set forth the minimum standards for quality and performance.

01400.3.3 SUBSTITUTION OF MATERIALS

The Engineer, in accordance with the General Conditions (Section 00700.8), may allow substitution of equipment or materials. The City reserves the right to reject substitutions if, in his opinion, the proposed substitutions will not achieve comparable equipment installation and performance standards.

01400.4 QUALITY OF WORK

All workmanship incorporated in the Work covered by the Contract are to be of the grade and quality described by these Specifications and the Special Provisions

01400.5 INSPECTION

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01400.5.1 AUTHORITY AND DUTIES OF INSPECTOR

01400.5.1.1 AUTHORITY - Inspectors representing the Engineer are authorized to inspect all work performed and all materials furnished and to reject defective material and any work that is improperly performed, subject to the final decision of the Engineer. This authority extends to all or any part of the Work, including the preparation, fabrication, or manufacture of any materials or equipment to be used for completion of the Work. The Inspector is not authorized to alter or waive the provisions of these Specifications or other provisions of the Contract Documents. The Engineer may delegate additional authority to the Inspector when such action is determined to be necessary.

01400.5.1.2 DUTIES - Inspectors keep the Engineer informed as to the progress of the Work and the manner in which it is performed. Inspectors are also assigned to call the Contractor's attention to any nonconformance with the Contract Documents. The Inspector will not act as foreman for the Contractor.

01400.5.2 INSPECTION OF MATERIALS

01400.5.2.1 TESTING - In accordance with the Contract Documents and at the option of the Engineer, materials to be supplied under this contract will be tested and/or inspected either at their place of origin or at the site of the Work. The Contractor shall give the Engineer written notification well in advance of actual readiness of materials to be tested and/or inspected at the point of origin. Satisfactory tests and inspections at the point of origin shall not be construed as a final acceptance of the material nor shall it preclude re-testing or re-inspection at the site of the Work.

01400.5.2.2 SAMPLES - The Contractor shall furnish such samples of materials as are requested by the Engineer, without charge. No material shall be incorporated into the Work until the Engineer has approved it (see Section 01300).

01400.5.3 CONTRACTOR LIABILITY

The inspection of the Work shall not relieve the Contractor of any of its obligations to fulfill its contract as herein provided, and unsuitable materials may be rejected notwithstanding that such unsatisfactory performance may have been overlooked and accepted or estimated for payment.

01510.1 DESCRIPTION

This section covers measures and instructions for prevention of damage to existing structures and utilities, whether above ground or underground, during execution of the Work of the Contract.

01510.2 PROTECTION OF EXISTING UTILITIES

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01510.2.1 INTEGRITY OF UTILITIES

The Contractor shall be responsible for safeguarding and maintaining the integrity of all conflicting utilities. This responsibility includes securing the assistance of available utility location services in the area in which the Work is being performed. However, when a conflicting utility line is discovered that was not shown on the plans, the Contractor shall contact the utility's owner and notify the Engineer immediately for resolution of the conflict. When realignment or relocation of the Work, or relocation of the conflicting utility is deemed necessary, the Engineer shall give direction in writing for the Contractor to proceed. Work resulting from such direction may be treated as a changed condition, and appropriate authorization and payment will be made in accordance with the General Conditions.

01510.2.2 LOCATING UTILITIES

It shall be the responsibility of the Contractor to locate and expose or identify all existing utilities, both underground and overhead, for the purpose of preventing damage to them. The Contractor shall notify all concerned utility offices at least 48 hours in advance of construction operations in which a utility agency's facilities may be involved. This shall include, but not be limited to, irrigation water, culinary water, telephone, gas, and electric.

01510.2.3 CHANGES TO UTILITIES

The Contractor shall be responsible for any and all changes to, or re-connections to, public utility facilities encountered or interrupted during prosecution of the Work, and all costs related thereto shall be borne by the Contractor. The Contractor shall negotiate with, and pay, the respective utility agency for work it must do in connection with moving, repairing, or restoring its utility/s. The Contractor shall further make all necessary notifications, scheduling, coordination, and management of details related to any such interference. The potential or projected cost of any public utility interference shall be included in the Contractor's price covering the major Contract Item to which the interference or changes are attributable.

01510.2.4 MAINTENANCE OF SERVICE

01510.2.4.1 CONTINUOUS SERVICE - Unless otherwise required in the Contract Documents, all utilities, both underground and overhead, shall be maintained in continuous service throughout the entire contract period. The Contractor shall be responsible and liable for any damages to or interruption of service caused by the construction.

01510.2.4.2 ACCIDENTAL INTERRUPTION OF SERVICE - In the event of interruption of other utility services as a result of accidental breakage, the Contractor shall promptly notify the appropriate responsible authority. The Contractor shall then cooperate with that authority in restoration of service as soon as possible, and shall bear all cost of repair. In no case shall interruption of any water or other utility service be allowed outside working hours unless the Engineer has issued prior authorization. When changeover of service connections to new utility lines becomes necessary, interruptions of individual services for periods of up to 8 hours will be allowed providing 24 hour advance notice has been given to affected users.

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01510.2.4.3 TEMPORARY INTERRUPTION AND RELOCATION - If the Contractor desires to temporarily or permanently relocate or shut down any utility or appurtenance, the Contractor shall make the necessary arrangements and agreements with the owner or operator of the respective utility and shall be completely responsible for all costs concerned with the relocation or shutdown and reconstruction. Shutdown and relocation and/or reconstruction shall be subject to inspection and approval by the Engineer and the owner of the utility.

01510.3 PROTECTION OF PROPERTY AND EXISTING STRUCTURES

01510.3.1 REMOVAL OR RELOCATION OF PROPERTY - All property removed or relocated by the Work shall be reconstructed in its original or new location as soon as possible. Restoration of existing property or facilities shall be to a condition as good or better than its original condition.

01510.3.2 DAMAGE TO PROPERTY - All property damaged by the Contractor, whether inside or outside the limits of easements provided by the Owner, shall be the responsibility of the Contractor. All such damages shall be repaired with like material and restored to its original condition, or better. Such repair or restoration shall be accomplished at the Contractor's expense without additional compensation from the Owner.

01510.4 PROTECTION OF PAVED SURFACES

To avoid unnecessary damage to paved surfaces, tracked equipment shall use rubber cleats or paving pads when operating on or crossing all existing paved surfaces unless authorized otherwise in writing by the Engineer.

01510.5 RIGHTS-OF-WAY AND EASEMENTS

01510.5.1 MINIMAL DISTURBANCE OF RIGHTS-OF-WAY - When construction easements have been obtained by the Owner, the Contractor shall take appropriate measures to minimize disturbances to surface improvements within the easements. The Contractor shall obtain a signed release from each property owner, approving restoration work in the construction easements across its respective property/s.

01510.5.2 CONSTRUCTION AREAS - The Contractor shall confine construction operations to the area within the dedicated rights-of-way for public through fares, or within areas for which construction easements have been obtained, unless the Contractor has made separate special agreements with the affected property owners in advance.

01510.5.3 PROPERTY OWNER NOTIFICATION - The Contractor shall give at least 48 hours advance notification of commencement of construction to property owners having land on which construction will take place. During all construction operations, the Contractor shall construct and maintain such facilities as may be required to provide access by all property owners to their property. No one shall be cut off from access to their property for a period exceeding eight (8) hours unless the Contractor has made special arrangements with the affected persons. The Contractor shall grade all disturbed surfaces required for motor vehicle traffic at least daily unless directed otherwise in the Contract Documents or in writing by the Engineer.

01520.1 DESCRIPTION

This Section includes requirements that shall be followed by the Contractor, to protect the environment. The Contractor shall also comply with any applicable additional requirements made by federal, state, or local government agencies.

01520.1.1 RELATED WORK AND REFERENCED SECTIONS **ENT 102458:2000 PG 194 of 480**

Section 00700 – General Conditions, paragraph 32 (for RDA funded projects)

01520.1.2 SUBMITTALS

See paragraph 01520.3.11 below.

01520.1.3 DEFINITIONS

Not used.

01520.2 MATERIALS

Not used.

01520.3 CONSTRUCTION REQUIREMENTS

01520.3.1 EXPLOSIVES AND BLASTING

The use of explosives on the work will not be permitted unless approved otherwise in the Contract Documents or in writing by the Engineer.

01520.3.2 DUST ABATEMENT

01520.3.1.1 CONTROL MEASURES - The Contractor shall furnish all labor, equipment, water and means required to provide effective dust control and abatement measures. Control measures shall be applied as often as necessary and wherever directed by the Engineer, to prevent construction operations from producing dust in amounts that may be damaging to property, vegetation, or animals, or detrimental to persons within reasonable proximity of the work site.

01520.3.1.2 HAUL ROUTES AND WORK SITES - The Contractor shall identify haul routes or material handling areas, outside of the Work site, whereon dust may be generated, and shall exercise appropriate measures to abate any dust problem caused by its operation. Such dust abatement measures shall be taken immediately when observed or when required in writing by the Engineer.

01520.3.3 STORM AND GROUND WATER

01520.3.3.1 CONTROL MEASURES - The Contractor shall provide and maintain, at all times during construction, ample means and devices to promptly remove all water entering the Work, whether the water is surface or ground water. Water removed by the Contractor shall be directed into ponds or areas separated from live streams or drainage ways, to keep sediment from entering live water.

- 01520.3.3.2 DRAINAGE PATTERNS - In excavation, fill, and grading operations, the Contractor shall take care, to disturb the existing drainage pattern as little as possible. Particular care shall be taken not to direct drainage water onto private property or into streets or drainage ways inadequate for the increased flow.
- 01520.3.3.3 FORDING OF WATERWAYS - Fording of live streams or any body of live water to accomplish the Work shall not be permitted. Mechanized equipment also shall not be operated in live water to accomplish the Work unless authorized in writing by the Engineer, or in the Contract Documents. ENT 102458;2000 PG 195 of 480
- 01520.3.3.4 FILLING OF WATERWAYS - The Engineer will not approve the filling of any ditches, washes, drainage ways, streams, wetlands, or other surface waters by the Contractor to accomplish the Work unless specific instructions are included in the Contract Documents which will provide for how the affected drainages or surface waters are to be treated.
- 01520.3.4 NOISE ABATEMENT
- In or near inhabited areas, particularly residential areas, the Contractor's operations shall be performed in a manner to prevent noise from becoming a nuisance or problem. Particular consideration shall be given to noise generated by repair and service activities during the night hours. Work hours are 7:00 a.m. to 7:00 p.m., Monday through Saturday. No work on Sunday.
- 01520.3.5 CHEMICALS
- All chemicals and/or petroleum based products used during project construction or furnished for project shall be handled, applied and disposed of in strict accordance with the printed instructions of the manufacturer and regulations enforced by Federal, State and Local health authorities.
- 01520.3.6 WASTE AND SURPLUS MATERIALS DISPOSAL
- 01520.3.6.1 CLEAN WORK SITE - The Contractor shall keep the work site, haul roads and other areas of use in a neat, clean condition, free from any accumulation of surplus materials. It shall be the responsibility of the Contractor, at its own expense, to remove and legally dispose of all surplus materials resulting from all Work activities performed in accordance with the Contract Documents.
- 01520.3.6.2 SURPLUS MATERIAL - Surplus material includes, but is not limited to, salvaged materials and equipment that otherwise would have been abandoned in place, rocks too large to be used as backfill, wood and other organic or unsuitable materials, trash, rubbish, and waste products of any nature, and any other debris generated by the Work.
- 01520.3.6.3 REGULATORY COMPLIANCE - Disposal of surplus materials shall be accomplished in accordance with all local codes, laws, ordinances, and all applicable safety laws (particularly to the requirements of Part 1926 of the OSHA Safety and Health Standards for Construction) in effect at the approved disposal site. In no case shall it be acceptable for any surplus material to be disposed of in streams, marshes or wetlands.
- 01520.3.6.4 APPROVAL OF DISPOSAL - The Engineer will not approve any disposal operation, which creates an unsightly and/or unsanitary nuisance. The Contractor shall maintain disposal sites in a reasonable condition of appearance during construction. When designated and/or public disposal sites are unavailable, written approval must be obtained from the Engineer to dispose of any surplus materials on any other site. All disposal sites are subject to approval by the Engineer. The Contractor shall secure permission and all permits required for use of any dumpsite not previously

arranged and designated by the Owner. The Contractor shall retain copies, and provide copies upon request, of all disposal permits and/or agreements obtained for the Contract Work.

- 01520.3.6.5 SCHEDULED REMOVAL - The Contractor shall establish regular intervals of collection and disposal of surplus materials during construction. Stockpiling of surplus materials for later disposal will not be approved or allowed.
- 01520.3.7 OPEN BURNING ENT 102458:2000 PG 196 of 480
- Open burning of materials may be allowed only in strict accordance with all regulations in effect for the area at which the burning would be performed, and the Contractor shall obtain any necessary permits from the appropriate governing entity prior to the start of burning. The Contractor shall not allow fire to spread beyond the material intended for burning. No accumulation of residue from burning shall remain on or adjacent to the construction site, without written approval of the Engineer.
- 01520.3.8 SANITATION
- 01520.3.8.1 TOILETS - The Contractor shall provide fixed or portable chemical toilets for employee use in conformance with the requirements of Part 1926 of the OSHA Standards for Construction and when public toilets are not available or within fifteen (5) minutes walking distance of the Work site.
- 01520.3.8.2 COLLECTION OF WASTES - The Contractor shall be responsible for daily collection of all sanitary and organic wastes. All wastes and refuse from sanitary facilities provided by the Contractor shall be disposed of away from the site in accordance with all laws and regulations pertaining thereto.
- 01520.3.9 HAZARDOUS MATERIAL
- 01520.3.9.1 REGULATORY COMPLIANCE - Disposition of any hazardous material or toxic or hazardous waste shall be made in accordance with the requirements and regulations administered by the State agency wherein the Work site is located.
- 01520.3.9.2 ABNORMAL CONDITIONS - Abnormal conditions include, but are not limited to, the following: buried barrels with liquid or solid contents; buried or above ground tanks with liquid contents; obnoxious odors; excessively hot earth; stained and discolored soils; smoke; unidentifiable powders, sludge, pellets; or any other similar condition.
- 01520.3.9.3 DISCOVERY AND NOTIFICATION - If any abnormal conditions are encountered during construction, which indicate the presence of a hazardous material, toxic, or hazardous waste, the Contractor shall immediately suspend work in the area of the discovery and notify the Engineer and treat the situation with extreme caution. The Contractor's operation in the area of discovery shall not resume until so directed by the Engineer; however, the Contractor shall continue working in other areas of the project, unless otherwise directed by the Engineer.
- 01520.3.9.4 DISPOSAL - When it becomes necessary for the Contractor to dispose of discovered materials, the work may be considered a change and administered in accordance with the General Conditions. Should the disposition of discovered waste material require special procedures or handling by certified personnel, the Contractor will make all such arrangements. When it becomes necessary to obtain permits for transporting or handling discovered material, the Owner will obtain the permits.

- 01520.3.9.5 SPILLS AND NOTIFICATION - In the event of spills of petroleum based products or hazardous wastes by the Contractor, the Contractor shall immediately notify the Engineer. The Contractor shall also notify the appropriate State environmental enforcement agency, unless the spill consists of less than one (1) gallon of petroleum based products. In no case will notification be made later than 24 hours after the discovery of the spill. In addition, written notification shall also be made within 5 calendar days of the discovery.
- 01520.3.9.6 COST OF CLEANUP - All costs for cleanup and disposal of hazardous materials due to spills, inappropriate handling, or negligence of the Contractor shall be borne by the Contractor.
- 01520.3.10 ENVIRONMENTAL COMPLIANCE **ENT 102458:2000 PG 197 of 480**
- 01520.3.10.1 REGULATORY COMPLIANCE - The Contractor shall comply with the applicable requirements of the National Historic Preservation Act as it relates to the preservation of ALL environmental resources. Clearance for protection of environmental resources located within the designated Work site is the responsibility of the City and such clearance has been obtained for the Contract, unless provided for otherwise in the Contract Documents.
- 01520.3.10.2 DISCOVERY OF HISTORIC/ARCHEOLOGICAL OBJECTS - The Contractor shall observe the following:
- DISCOVERY AND NOTIFICATION - If a suspected or unsuspected historic, archeological, or paleontological item, feature, or site is encountered, construction operations shall be immediately stopped in the vicinity of the discovery and the Engineer shall be notified of the nature and exact location of the findings. The Contractor shall not damage the discovered objects and shall provide written confirmation of the discovery to the Engineer within two (2) calendar days.
 - RESTRICTION OF CONSTRUCTION - Should operations in the vicinity of a discovery be restricted, the Engineer will keep the Contractor informed concerning the status of the restriction. The Contractor should be aware that the time necessary for the City to negotiate the handling of the discovered is variable and is dependent on the nature and condition of the circumstances. It is possible that a delay of as much as three weeks in the vicinity of the discovery can be expected. The Engineer will inform the Contractor when the restriction is terminated. Changes required to accommodate delay or Work resulting from the discovery will be authorized in accordance with the General Conditions.
- 01520.3.11 OPERATIONS OUTSIDE OF THE PROJECT SITE
- In the event the Contractor chooses to use any site or means of obtaining resources beyond those provided as part of the Contract, the Contractor shall retain the services of a qualified, certified environmental consultant to produce a research design or plan for obtaining any and all necessary environmental clearances for such use. The Contractor shall provide the plan to the Engineer for review and approval, as required, following which the plan shall be implemented. The Contractor shall submit evidence of environmental clearances and compliance before commencing any activities within the extended use area. At a minimum, clearances will include those listed below. Additional clearances may be required as necessary.
- 01520.3.11.2 CULTURAL RESOURCES (Archeological and Historic) - Clearance may require consultation with the State Historic Preservation Office.
- 01520.3.11.3 THREATENED AND ENDANGERED SPECIES - Compliance may require written clearance from the U.S. Fish and Wildlife Service.

01529.3.11.4 FLOOD PLAINS - May require consultation with the Federal Emergency Management Agency (FEMA) or corresponding state agency.

01520.3.11.5 WETLANDS AND OTHER BODIES OF WATER - May require consultation with the Army Corps of Engineers and/or appropriate state agency.

The Contractor is cautioned that obtaining environmental clearances can be costly and time consuming.

01520.4 METHOD OF MEASUREMENT

Not used.

01520.5 BASIS OF PAYMENT

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Not used.

01580.1 DESCRIPTION

In general, the Contractor is responsible for providing and maintaining access to the Work, handling and storing of materials and equipment, safety and security within the Work site, and coordination and cooperation with the Owner, its representatives, governing authorities and other contractors working for the Owner in accordance with the provisions of the General Conditions. This section contains specific requirements which apply to these responsibilities.

01580.1.1 RELATED WORK AND REFERENCED SECTIONS

Section 02005 – Traffic Control

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01580.1.2 SUBMITTALS

Not used.

01580.1.3 DEFINITIONS

Not used.

01580.2 WORK SITE ACCESS

01580.2.1 INVESTIGATION OF WORK SITE AREA

The Contractor shall make its own investigation of the condition of available public and private roads and of clearances, restrictions, bridge load limits, and other limitations affecting ingress and egress to the site of the work.

01580.2.2 HAUL ROADS

It shall be the Contractor's responsibility to construct and maintain any new haul roads required for its construction operations.

01580.2.3 USE OF PUBLIC STREETS AND ALLEYWAYS

Nothing herein shall be construed to entitle the Contractor to the exclusive use of any public street, alleyway, or parking area during the performance of the Work, unless shown otherwise in the Contract Documents.

01580.2.4 CLOSURE OF PUBLIC ROADWAYS

No street, road, or highway shall be closed to the public without first obtaining permission from the proper governmental authorities and the Engineer. Where excavation is being performed in streets or highways, one lane in each direction shall be kept open to traffic at all times, unless otherwise authorized by the Contract Documents or the Engineer. Toe boards, or other measures, may be required by the Engineer, to retain excavated material when deemed necessary.

01580.2.5 INTERFERENCE WITH UTILITIES

The Contractor shall so conduct operations as not to interfere unnecessarily with the infrastructure of utility companies or other agencies in such streets, alleyways, or parking areas.

01580.3 PUBLIC SAFETY AND ACCESS

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Fire hydrants, approaches to fire stations, police stations and hospitals on or adjacent to the Work shall be kept accessible at all times. Appropriate measures shall be taken by the Contractor, to assure the use of sidewalks, and the proper functioning of all gutters, sewer inlets, water mains, drainage facilities and other infrastructure.

The Contractor's responsibility for Work safety or liability for Work site accidents is not lessened by the presence of the Engineer or his or another inspector performing monitoring of Work site safety conditions.

See also Section 02005 - Traffic Control.

01580.4 CONTRACTOR'S USE OF THE WORK SITE

The Contractor's use of the Work site shall be limited to its construction operations. Written approval by the Engineer will be required for any other use of the site, such as material and equipment storage, personnel vehicle parking, on-site fabrication facilities and field office.

01580.5 OFF-SITE STORAGE

The Contractor shall make arrangements for, bear any use costs associated with, and obtain written permission from the Engineer prior to using any off-site storage or shop areas or facilities determined necessary for execution of the Work. Storage facilities shall be equipped with fences and/or lockable entries that will prevent entry by unauthorized parties. Before off-site storage facilities are placed in use, the Contractor shall provided the City keys or combinations to locking devices used to secure the facility.

01580.6 COOPERATION WITH OTHER CONTRACTORS

Prior to authorizing other contractors to work on or adjacent to the Work site, the City shall notify the Contractor in writing and provide the name and address of the contractor, the name of its supervisor, a description of the work to be performed, and a schedule which shows the dates and planned segments of the work to be completed by the other contractor. In the event that conflicts or interferences occur between the Contractor and the other contractor's operation, the Engineer shall be notified immediately. The Engineer shall then take appropriate action needed to resolve the problem.

02005.1 DESCRIPTION

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This section covers furnishing and maintaining all traffic control devices, flaggers and pilot vehicles necessary for protection of the Work, the workers and the traveling public in accordance with these Contract Documents. The requirements of this section are not intended to supersede, but shall supplement, the provisions contained in the "Manual of Uniform Traffic Control Devices" issued by the U.S. Department of Transportation, and any other applicable state or local traffic control regulations.

02005.1.1 RELATED WORK AND REFERENCED SECTIONS

Section 01580 - Work Site Management
Section 02206 - Access Roads and Temporary Use of Roads

02005.1.2 SUBMITTALS

The Contractor, upon request of the Owner or Engineer, shall submit detailed traffic control plans for specific areas of the Work.

02005.1.3 DEFINITIONS

Traffic Control Devices - All temporary traffic control and warning devices required to warn traffic of, and to guide it through, construction areas as required under this Contract, including, but not limited to: portable cones and barricades, signs, channeling devices, paint striping, lighting devices, flags, etc.

Flaggers - Qualified and alert persons equipped with safety warning devices who direct traffic through construction areas.

Traffic Lane - Ten (10) feet of clear street width with a safe motor vehicle speed of twenty-five (25) miles per hour.

Pilot Car - Any designated and properly marked vehicle used for leading groups of vehicular traffic through construction areas.

02005.2 MATERIALS

Not Used.

02005.3 CONSTRUCTION REQUIREMENTS

02005.3.1 COORDINATION OF WORK AND TRAFFIC CONTROL

The Contractor shall endeavor to organize its work force in such a manner as to minimize the closure of public streets and roadways within the Work site. If conditions justify, the Engineer may direct the Contractor to conduct Work in specific areas and/or to specific tasks to avoid closure or interference with traffic on public streets and roadways.

02005.3.2 CLOSURE OF PUBLIC THOROUGHFARES

The Contractor shall not close any public street or roadway without prior approval by the Engineer. When closure is necessary, and approved, the street or roadway shall only be closed to through traffic and not to local traffic. Closure may extend for one city block only, or 700 feet,

whichever is less. Closure of streets and roadways shall be made with barricades meeting State DOT standards. Traffic shall be kept open on streets and roadways where no detour is possible.

02005.3.3

MAINTENANCE OF EXISTING SIGNS

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Existing traffic signs other than stop, yield, and street name signs shall be maintained by the Contractor until such time as construction renders them obsolete. At that time the Contractor shall remove signs and posts without damage and deliver them as directed by the Engineer.

02005.3.4

PROTECTION OF WORK AND TRAFFIC

All obstructions and excavations, within traveled streets and roadways, shall be protected with traffic control devices meeting State DOT standards. Traffic control devices, placed within streets and roadways, shall be illuminated at night, and such illumination shall function from sunset to sunrise. Local jurisdiction may require traffic control measures greater than those of State DOT standards, in which case the Contractor shall comply with such requirements.

Whenever the Engineer finds traffic control conditions at the Work site to be inadequate to assure public safety, or the Contractor's protective facilities to be inadequate, the Engineer may require the Contractor to provide the additional necessary facilities or services. The Contractor shall bear the cost of the additional protection.

See also Subsection 01580.3.

02005.4

METHOD OF MEASUREMENT

02005.4.1

TRAFFIC CONTROL AS LUMP SUM

If traffic control appears as a separate item in the Bid Schedule, it shall be measured as a lump sum item. Therefore, with the possible exception of the items mentioned in the following two paragraphs, no separate measurement will be made for furnishing and maintaining traffic control devices, personnel, or any vehicles or other equipment used for traffic control.

02005.4.2

FLAGGING

When flagging is listed separately in the Bid Schedule, the work of flag persons will be measured by counting the number of hours put in by each separate flag person. This measurement shall include the time and/or mileage for any vehicle or other equipment required for performing the flagging work.

02005.4.3

PILOT VEHICLE

When a requirement for the use of pilot vehicles is called for separately in the Bid Schedule, that use will be measured by counting the number of hours each separate vehicle is in actual operation piloting or otherwise directing traffic.

02005.5

BASIS OF PAYMENT

02005.5.1

Unless provided for in the Contract Documents, the cost of all traffic control, including flagman, barricades, pilot cars and other devices, shall be included in the Contract Price and no separate measurement and payment will be provided.

02005.5.2 When provided in the Bid Schedule, the generally accepted quantities for traffic control shall be:

PAYMENT ITEM	UNIT
Traffic Control	Lump Sum
Flaggers	Hours
Pilot Vehicles	Hours

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02015.1 DESCRIPTION

This section covers the removal of vegetation, debris, and other obstacles from the defined rights-of-way and limits of the project area and/or construction work site.

02015.1.2 RELATED WORK

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Section 01510 - Protection of Existing Properties
Section 02200 - Trench Excavation and Backfill
Section 02500 - Removal and Replacement of Surface Improvements
Section 02900 - Landscaping

02015.1.3 DEFINITIONS

Clearing - consists of removal and disposal of trees, stumps, logs, limbs, sticks, vegetation, rubbish, debris and other material on the natural ground surface.

Grubbing - consists of removing and disposing of roots (one-inch and larger diameter), tree stumps, buried logs, debris, and other underground obstructions.

02015.2 MATERIALS

Not used

02015.3 CONSTRUCTION REQUIREMENTS

Clear, grub, remove and dispose of all trees, vegetation and debris within the staked limits of the roadways, trenches, channels, easements, embankments, structures, and other designated areas. Do not injure or damage trees, shrubs, or other vegetation and objects to remain intact as designated by the Engineer or the Owner. Such items are to be fully protected from injury at the Contractor's expense.

02015.3.1 CLEARING

Areas within the limits of excavation and embankment slope stakes shall be cleared.

Tree branches extending over the area to be cleared and which hang within 12 feet of the ground surface shall be cut off in a neat and workmanlike manner. When such branch removal is necessary, the Contractor shall remove other adjacent branches on the tree under the direction of the Engineer so as to present a balanced appearance. Scars resulting from the removal of branches shall be treated with a heavy coat of approved tree sealant.

02015.3.2 GRUBBING

Grub all areas within the limits described as follows:

02015.3.2.1 FOR CONSTRUCTION OF ROADWAYS - Grub the area between the limits of the excavation and embankment slope stakes to a depth of two (2) feet below natural ground level to remove all stumps, roots, buried logs and other underground debris. However, when the roadway embankment already is two feet or more above the natural ground level, stumps cut less than 6 inches above natural ground, together with roots and other non-perishable obstructions, may remain in place.

02015.3.2.2 FOR CONSTRUCTION OF PONDS OR LAGOONS AND STRUCTURES - completely grub the pond area within the boundaries of the dikes or structures to a depth of two (2) feet and remove all stumps, roots, buried logs and other underground debris. Grubbing of this area shall include removal of the top 6-inches of organic laden topsoil and stockpiling it for later distribution over areas shown in the Contract Documents or directed by the Engineer.

02015.3.3 BACKFILLING

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All stump holes, cuts, depressions and other holes resulting from clearing and grubbing operations within areas designated to receive pipelines, structures, or embankments shall be backfilled and compacted to the density of the surrounding ground.

02015.3.4 DISPOSAL

The Contractor shall dispose of all materials resulting from clearing and grubbing operations as required in the Contract Documents and in accordance with Section 01520 of these Specifications.

02015.3.5 MARKERS, MONUMENTS AND DATA POINTS

Land monuments, property markers or official datum points shall be protected until their removal is approved. When movement of monuments or markers is deemed necessary and approved by the Engineer, all such monuments or markers shall be carefully referenced for re-establishment before removing.

02015.4 METHOD OF MEASUREMENT

02015.4.1 SEPARATE PAYMENT

Measurement for "Clear and Grub" shall be made either as lump sum or by counting the number of acres to the nearest tenth (10^{th}), of area actually cleared and grubbed within the limits shown on the Drawings or as directed and approved by the Engineer. For areas where ponds or lagoons are to be constructed, this measurement shall include the removal and stockpiling of the first six (6) inches of topsoil in addition to grubbing to the required depths.

02015.4.2 NO MEASUREMENT

02015.4.2.1 NO PAY ITEM FOR CLEAR & GRUB - When the Bid Schedule does not contain a pay item for "Clear and Grub", then that work will be considered incidental to other Work items which require clearing and grubbing and no separate measurement shall be made.

02015.4.2.2 ROADWAY EXCAVATION and/or BORROW - Material used for filling depressions will be measured separately only when "Roadway Excavation" and/or "Borrow" appear as separate pay items on the Bid Schedule. Measurement will be made by counting the number of cubic yards of material moved and placed as designated on the Drawings or as directed and approved by the Engineer. If "Roadway Excavation" or "Borrow" are not included in the Bid Schedule, material used for filling depressions will not be measured separately, but will be considered incidental to the Work.

02015.5

BASIS OF PAYMENT

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The accepted quantities will be paid for at the contract unit price.

PAYMENT ITEM	UNIT
Clear and Grub	Lump Sum
Clear and Grub	10 th of Acre

02020.1 DESCRIPTION

Furnish and provide labor and equipment for investigation of existing miscellaneous pipelines, wires or cables, and other miscellaneous sub-surface features as required by the Engineer.

02020.1.1 RELATED WORK

Section 01510 - Protection of Existing Improvements ENT 102458:2000 PG 207 of 480

02020.1.2 SUBMITTALS

Not used.

02020.1.3 DEFINITIONS

Not used.

02020.2 MATERIALS

The Contractor shall provide a backhoe and qualified operator; laborer with hand shovel; appropriate fuel and lubricants, necessary equipment servicing materials; and appropriate equipment for transporting the backhoe to perform the investigation. The backhoe shall be a rubber tired CASE 580 backhoe, or an approved unit of equivalent or greater size and capacity, having accumulated not more than 5,000 hours operating time.

02020.3 CONSTRUCTION REQUIREMENTS

02020.3.1 EXPOSURE BY EXCAVATION

When directed by the Engineer, the Contractor shall excavate and expose miscellaneous pipelines, structural features, soil materials and other underground features which may be present at the work site. The location and extent of exposure shall be determined on site by the Engineer. Designation of such areas shall be made in writing, usually in the form of a Work Order, by the Engineer.

02020.3.2 REPLACEMENT OF EXCAVATED MATERIALS

Work required hereunder shall include replacement of excavated materials sufficiently to restore the site to a safe condition as determined by the Engineer. Full restoration of materials such as pavement, concrete slabwork, sod, etc., in the investigated area will be accomplished in accordance with the Contract Documents and as directed by the Engineer

02020.4 METHOD OF MEASUREMENT

02020.4.1 MEASUREMENT BY HOURS OF WORK

Measurement of subsurface investigation shall be made by counting the actual number of hours of work completed by the machine and operator to investigate miscellaneous underground features as required by the Engineer. No allowance of time will be made for transporting the backhoe to and from the job site when the backhoe is located on the site of the Contract.

02020.4.2

MEASUREMENT FOR OTHER ITEMS OF WORK

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When restoration of the excavated area requires provision of pavement, concrete slabwork, sod, etc., separate measurement will be made for those materials in accordance with the respective requirement/s for measurement of that item in the Contract Documents.

02020.5

BASIS OF PAYMENT

The accepted quantity of work will be paid for at the contract unit price of:

PAYMENT ITEM	UNIT
Subsurface Investigation	Hour

When provision of designated materials is required for restoration of the excavation, payment for such materials shall be made in accordance with the respective provisions of the Contract documents.

02105.1 DESCRIPTION

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This section covers obtaining permission, permits, clearances, etc.; as necessary to develop source(s), purchasing or manufacturing, loading, hauling, placing and compacting earthwork materials described herein, as shown on the Drawings and/or required by these Specifications.

02105.1.1 RELATED WORK

Section 02200 - Trench Excavation and Backfill
Section 02203 - Earthwork for Lagoons

02105.1.2 SUBMITTALS

When the Bid Schedule indicates quantities of materials described in this section in excess of 50 cubic yards or 50 tons, or when requested otherwise by the Engineer, the Contractor shall provide test results from a certified independent laboratory which has sampled and performed the prescribed test/s for those materials.

02105.1.3 DEFINITIONS

Granular Material - Material for which the sum of plasticity index (AASHTO T-90) and the percent of material passing a No. 200 sieve (AASHTO T-27) shall not exceed 23.

Silt - Material which passes the No. 200 (AASHTO T-11) sieve and has a plasticity index not greater than 10.

Clay - Material which passes the No. 200 sieve and has a plasticity index greater than 10.

Bedding - Materials placed immediately around and adjacent to pipe installed in trenches.

Borrow - Material obtained from a source away from the site on which installed and/or excavated and used to supplement insufficient quantities of material required.

02105.2 MATERIALS

02105.2.1 ON-SITE TRENCH OR STRUCTURAL BACKFILL

On-site trench or structural backfill consists of material excavated during trenching or foundation excavation which is free of cinders, ashes, wood, vegetation, frozen or other deleterious material or rocks with a maximum particle size not greater than 6-inches. Material may be required to be processed or transported along the excavation.

02105.2.2 IMPORTED TRENCH OR STRUCTURAL BACKFILL

Imported trench or structural backfill consists of granular material obtained from sources indicated on the Drawings, designated in the Special Provisions or approved by the Engineer. Borrow materials shall be free of cinders, ashes, wood, vegetative matter, frozen or other deleterious matter with a maximum particle size not greater than 6-inches. Pit Run Borrow may be used as backfill in trenches, excavations for structures, in roadway subgrades, or as otherwise shown on the plans or called for by the Engineer. Material may be processed or may be pit run.

02105.2.3 ON-SITE PIPE BEDDING

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On-site pipe bedding consists of material excavated during the trenching operation which is free of cinders, ashes, wood, vegetation, frozen or other deleterious material or rocks with a maximum particle size not greater than that shown below in Table 1. Material may be required to be processed or transported along the trenching operation.

02105.2.4 IMPORTED PIPE BEDDING

Imported pipe bedding consists of granular material excavated from an approved borrow source which is free of cinders, ashes, wood, vegetation, frozen or other deleterious material or rocks with a maximum particle size not greater than that shown in Table 1 below. Material may be processed or may be pit run.

02105.2.5 SAND

Sand shall be graded granular material which passes a 3/8-inch sieve, with not more than 10 percent passing the No. 200 sieve (AASHTO T-27) and free from cinders, ashes, wood, vegetation, frozen or other deleterious material.

02105.2.6 GRAVEL PIPE BEDDING

Gravel pipe bedding shall be graded gravel which has been screened to meet the maximum particle size shown in Table 1 below for different pipeline materials and contains no more than 10 percent passing the No. 200 sieve (AASHTO T-11). Gravel pipe bedding material shall be free from cinders, ashes, wood, vegetative matter, frozen or other deleterious material.

Table 1 - MAXIMUM PARTICLE SIZE FOR PIPE BEDDING

Pipe	Size
Corrugated Metal and Welded Steel	1"
Galvanized Steel, PVC and Polyethylene	1"
Ductile Iron, Cast Iron and Concrete	2"

02105.2.7 UNTREATED BASE COURSE

Untreated base course consists of graded natural gravel or crushed rock without any deleterious materials, tested in accordance with AASHTO T-27 and T-11 which meets the gradation requirements in Table 2 below.

Table 2 - MAXIMUM PARTICLE SIZE FOR UNTREATED BASE COURSE

Sieve Size	Percent Passing
1-inch	100
1/2-inch	75-95
#4	40-60
#16	20-40
#200	5-12

- 02105.2.8 BITUMINOUS SURFACING ENT 102458:2000 PG 211 of 480
- Plant mix bituminous material, with maximum particle size not greater than 3/4-inch, meeting the requirements of Section 02511 of these Specifications.
- 02105.2.9 DRAIN GRAVEL
- Drain gravel consists of washed natural gravel or crushed rock or slag, with a maximum particle size of 1-inch, with 100 percent being retained on the No. 10 sieve, and without any deleterious material.
- 02105.2.10 RIPRAP
- Riprap consists of durable, angular, sound and hard field or quarry stones free from cracks and structural defects. Source of supply shall be approved by the Engineer. Fifty percent of the stones shall be of sizes between one-half and two-thirds of the riprap layer thickness shown on the Drawings. Not more than 10-percent of the stones by weight shall be of a size less than one-tenth of the riprap layer thickness shown on the Drawings and the specific gravity of the stones must range between 2.5 and 2.82 (AASHTO T-85). Durability of the stones shall be in excess of 40 percent (AASHTO T-210).
- 02105.2.11 SUBGRADE GRANULAR FILL
- Subgrade granular fill consists of well graded granular soils with a maximum of 50 percent passing the No. 4 sieve and a maximum of 20 percent passing the No. 200 sieve and no materials greater than 4-inches in diameter.
- 02105.3 CONSTRUCTION REQUIREMENTS
- 02105.3.1 LOCAL GOVERNMENT SPECIFICATIONS
- Differences may exist between the requirements of these Specifications for sitework materials such as backfill, bedding, untreated base course and bituminous surface course, and those of local government entities. Such differences may affect Contract prices; therefore, when Contract Work falls within the boundaries of any local government, the Contractor shall make himself aware of that entity's specifications for those materials. If differences exist between those specifications and these, unless otherwise approved by the Engineer, the more stringent ones shall apply.
- 02105.3.2 BORROW AND DISPOSAL SITES
- The Contractor shall, at its own expense, secure all necessary access and borrow sites for acquisition or removal and to dispose of excess backfill or waste materials, unless otherwise shown on the Drawings.
- 02105.3.3 ON-SITE MATERIALS
- Unless otherwise shown on the Drawings or directed by the Engineer, on-site pipe bedding and trench backfill will be used for installation of all pipe. In areas where suitable on-site material is not available, other material, which meets these Specifications, will be used when shown on the Drawings, provided for in these Contract Documents or approved by the Engineer.

02105.3.4 SCALES

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When ton weight is to be used to determine quantities of earthwork materials used, the Contractor shall provide his own scales or access to other scales at his own cost. Scales shall be certified accurate.

02105.4 METHOD OF MEASUREMENT

02105.4.1 NO MEASUREMENT

On-Site Pipe Bedding and On-site Trench or Structural Backfill will be considered part of the items for piping or excavation associated with structures included in the Bid Schedule and no separate measurement for these materials will be made.

02105.4.2 SEPARATE MEASUREMENT

02105.4.2.1 IMPORTED MATERIALS - Quantities of imported pipe bedding and imported trench or structural backfill shall be determined in cubic yards in original position based on average end area times the length of material taken. Measurement also may be made by determining the total ton in place weight over scales.

No allowance will be made for bedding and backfill materials required to fill voids caused by trenching operations, which exceed the dimensions shown on the Drawings.

02105.4.2.2 SAND AND GRAVEL - Quantities of sand and gravel pipe bedding shall be determined in cubic yards in place, calculated by multiplying the measured length of trench by the measured depth of bedding by the pay width shown on the Drawings, or as directed by the Engineer in the field. Measurement also may be made by determining the total ton in place weight over scales.

No allowance will be made for materials required to fill voids caused by trenching operations, which exceed the dimensions shown on the Drawings.

02105.4.2.3 UNTREATED BASE COURSE - Quantities of untreated base course shall be determined in cubic yards, calculated by multiplying the measured length by the measured breadth by the measured depth of material in place and accepted. Measurement also may be made by determining the total ton in place weight over scales.

02105.4.2.4 BITUMINOUS SURFACING - Quantities of bituminous surfacing shall be determined in square yards by multiplying the length of material in place and accepted by the pay width shown on the Drawings, or as directed by the Engineer in the field. Measurement also may be made by determining the total ton in place weight over scales.

02105.4.2.5 DRAIN GRAVEL - Quantities of drain gravel shall be determined in cubic yards calculated by multiplying the measured length by the measured depth of bedding in place by the pay width shown on the Drawings, or as directed by the Engineer in the field. Measurement also may be made by determining the total ton in place weight over scales.

02105.4.2.6 RIPRAP - Quantities of riprap shall be determined in cubic yards by multiplying the measured length by the measured breadth by the measured average depth of material in place and accepted.

02105.4.2.7 SUBGRADE GRANULAR FILL - Quantities of subgrade granular fill shall be determined in cubic yards by multiplying the measured length by the measured breadth by the measured depth of material in place and accepted.

02105.5 BASIS OF PAYMENT

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The accepted quantity shall be paid for at the contract unit price for:

PAYMENT ITEM	UNIT
Imported Trench or Structural Backfill	Cubic Yard
Imported Trench or Structural Backfill	Ton
Imported Pipe Bedding	Cubic Yard
Imported Pipe Bedding	Ton
Sand	Cubic Yard
Sand	Ton
Gravel Pipe Bedding	Cubic Yard
Gravel Pipe Bedding	Ton
Untreated Base Course	Cubic Yard
Untreated Base Course	Ton
Bituminous Surfacing	Square Yard
Bituminous Surfacing	Ton
Drain Gravel	Cubic Yard
Drain Gravel	Ton
Riprap	Cubic Yard
Subgrade Granular Fill	Cubic Yard

02200.1

DESCRIPTION

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This section covers furnishing of equipment, labor, and materials to clear, excavate, backfill and compact trenches for utilities. Excavation and backfill for piping appurtenances such as manholes, inlets, transition structures, junction structures, vaults, thrust blocks, valve boxes, catch basins, etc., shall be included, as also shall be restoration of the disturbed ground surface in accordance with the Contract Documents.

02200.1.1

RELATED WORK

Section 01510 - Protection of Existing Properties
 Section 02015 - Clearing and Grubbing
 Section 02208 - Flowable Backfill
 Section 02222 - Water Pipe Installation
 Section 02224 - Sewer Pipe and Manhole Installation
 Section 02105 - Earthwork Materials
 Section 02315 - Boring and Jacking
 Section 02320 - Pipe Encasement
 Section 02500 - Removal and Replacement of Surface Improvements
 Section 02900 - Landscaping

02200.1.2

SUBMITTALS

02200.1.2.1

MOISTURE DENSITY TESTING AND GRADATION DETERMINATIONS - A documentation system shall be maintained by the Contractor to record results from all moisture/density testing and gradation determinations. Records of these tests shall show the following information as a minimum:

- Date of test.
- Type of test.
- Name of person performing test.
- Location of sample taken.
- Results of test and comparison with specified value required for compliance.

Upon completion of each gradation test or moisture/density test, a copy of the record for the respective test shall be delivered to the Engineer within one (1) working day following the completion.

02200.1.2.2

COMPLIANCE TESTING - Documentation shall also be made, in field diaries, of all compliance tests performed by the Contractor. Documentation shall be made available to the Engineer upon request.

02200.1.3

DEFINITIONS:

Trench Width - Shall not be more than 18 inches greater than the outside diameter of the pipe being installed at a point 12 inches above the top of the pipe unless otherwise shown on the Drawings. The width of the trench above that level shall be the minimum width required for safe working conditions, sheeting, bracing and for proper installation of the work.

Trench Grade - The vertical elevation of the flowline of the pipe being installed in the trench.

Open Trench - Shall include trench sections which have been excavated and are awaiting completion of pipe installation, backfill, compaction or installation of a temporary surface.

Surface Restoration - Shall include the Work required to restore the ground surface disturbed for trench excavation. Replacement of road surfacing, planting and landscaping removed for trench excavation, will not be considered as trench excavation and backfilling.

Consolidated Backfill - A condition of backfilling for which a specified compaction density is required. Maximum lift, prior to compaction, for consolidated backfill shall be 8 inches unless otherwise approved by the Engineer.

Unconsolidated Backfill - A condition of backfilling for which no compaction density is specified and the required compaction effort is layer placing and then compacting by wheel rolling or use of compacting equipment. Lifts of up to 24 inches are allowed for unconsolidated backfill.

Unclassified Excavation - A determination for excavating whereby no consideration will be given to different kinds of materials that are encountered.

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02200.2 MATERIALS

Not used.

02200.3 CONSTRUCTION REQUIREMENTS

02200.3.1 PERMITS

For work which is to take place within state and/or federal road and highway rights-of-way, the Contractor shall be responsible for obtaining all required encroachment and construction permits prior to beginning any work within the rights-of-way.

All work in any city public right-of-way will require an approved excavation permit from city. The following information is required to obtain an excavation permit to work on public utilities or streets: (1) Copy of Contractors License; (2) Certificate of Insurance; (3) Cash bond of \$10,000.00; and (4) Detailed drawing of proposed work and traffic control (4 copies).

The following information is required of an individual property owner doing his/her own work for drive approaches and other similar minor cement work in order to obtain an excavation permit: (1) Proof of homeowners or similar insurance; (2) Cash or escrow bond in the amount of \$1,000.00 (3) Detailed drawings of the proposed work, including safety, barricades, and traffic and/or pedestrian control.

The contractor is given a copy of the signed permit and the signed / approved plan after the city engineer or his/her designee has approved and signed the application. Time limits may be set; and the permit can be suspended for non-compliance. A copy of the excavation permit shall be on site during construction.

02200.3.2 CLEARING AND GRUBBING

On areas outside of established roadways, the area to be disturbed by the trenching operation shall be cleared and grubbed in accordance with Section 02015 prior to beginning the trenching operation.

- 02200.3.3 EXCAVATION ENT 102458:2000 PG 216 of 480
- 02200.3.3.1 UNCLASSIFIED EXCAVATION - All excavation for this project shall be unclassified excavation, unless otherwise determined by the Engineer.
- 02200.3.3.2 STAKING - Location staking of piping will be provided by the Owner in accordance with the provisions of Section 1560 unless indicated otherwise in the Contract Documents.
- 02200.3.3.3 EXPOSURE OF UNDERGROUND FEATURES - Before any trench excavation is started, the Contractor shall locate and expose all existing underground utilities, structures, etc., which may interfere with, or conflict with, the trench being excavated. In case of conflicts, the Contractor shall make adjustments in the location of the excavation at the direction of the Engineer. Such adjustments shall be made at no additional cost to the Owner.
- 02200.3.3.4 The Contractor shall perform all excavation to the depth specified in the Drawings and/or as required to accomplish the Work. During the excavation operations, excavated materials which are suitable for use as backfill for trenches or around structures, shall be piled separately at sufficient distance from the edge of the excavation to be out of the way of equipment and to prevent slides and cave-ins from embankment overloading. All excavated materials not suitable for, or not required for, fill or backfill shall be separated and removed promptly from the site of the Work and disposed in an approved site in accordance with Section 1520.
- 02200.3.3.5 PUBLIC TRAVEL - Materials excavated within roadways, regardless of their disposition, shall be piled in such manner that will cause the minimum of inconvenience to public travel and always allow for emergency vehicle passage.
- 02200.3.3.6 OPEN TRENCH - At no time shall the Contractor allow more than 500 cumulative feet of trench to be open for the overall project, unless otherwise approved by the Engineer.
- 02200.3.3.7 SHORING - Shoring and/or trench boxes shall be used wherever needed to protect workers and adjacent structures and property of the Work in accordance with OSHA requirements. The arrangement of bracing of shoring shall not be set so as to stress any portion of completed work.
- 02200.3.3.8 BARRICADING OPEN WORK - Excavations left open at the end of the work day shall be surrounded by barricades and warning tape.
- 02200.3.4 EXCAVATION IN ROCK
- 02200.3.4.1 SOLID ROCK EXCAVATION - If:
- The Contract Documents contain provisions for "Solid Rock Excavation", and
 - If rock has been encountered in the excavation, and
 - If the Contractor has made three attempts to remove the rock using a "Kelly" or similar type ripper having not less than 235 fly wheel horsepower, then
- the excavation of such material will be considered as "solid rock excavation".
- 02200.3.4.2 BLASTING - When blasting is deemed necessary for rock removal, the Contractor shall comply with all applicable State and Local laws, ordinances, and provisions for blasting safety and obtain written approval from the Engineer prior to starting of drilling and/or blasting operations.

In all cases, blasting shall be performed by experienced, qualified blasters. The Contractor is responsible for any and all damage caused by blasting, and blasting will not be allowed within 15 feet of any existing structures.

02200.3.5 OVER-EXCAVATION

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02200.3.5.1 UNAUTHORIZED OVER-EXCAVATION - Care shall be taken to not excavate below the depth required by the Drawings. Any unauthorized over-excavation shall be refilled and compacted with material meeting the requirements of Section 02105 and approved for use by the Engineer at the expense of Contractor.

02200.3.5.2 ROCK - Whenever rock is encountered in the trench bottom, the trench shall be over-excavated a minimum of 6 inches below the design elevation of the bottom of the pipe. The over-excavated portion of the trench shall be filled with approved bedding material and the bedding compacted, all at the expense of the Contractor, unless otherwise approved by the Engineer and the Owner.

02200.3.5.3 UNSTABLE NATIVE FORMATIONS - The Contractor shall notify the Engineer if soft, spongy, or otherwise unstable native formations, that are not suitable for structure or pipeline foundations, are encountered in excavations. In the event the Engineer determines that the existing foundation materials are unacceptable, the Contractor will be directed to over-excavate, remove and replace the unsuitable soil materials. The over-excavation shall be backfilled with approved select materials and compacted in accordance with the requirements described herein. Such situation will be considered as a changed condition and the Contractor will be compensated in accordance with Subsection 00700.13 of the General Conditions.

02200.3.6 PIPELINE ACCESSORY INSTALLATION

02200.3.6.1 EXCAVATION FOR ACCESSORIES - The Contractor may excavate to place the sides of manholes, vaults, valve boxes, inlet structures, catch basins or other accessory structures directly against the excavated surface, provided that the faces of the excavation are firm and unyielding and are at all points outside the structure lines shown on the plans. If the native material is such that it will not stand without sloughing, the Contractor shall over-excavate to place the structure and this over-excavation shall be backfilled and compacted, using the same material required for the adjoining pipeline trench.

02200.3.6.2 ACCESSORY SUPPORT - To prevent displacement of valve boxes and other accessory structures, trench backfill shall be compacted to at least 95% of maximum density as determined by AASHTO T-99 for 6 feet along the trench on each side of the box or structure.

02200.3.7 TRENCH BOTTOM PREPARATION

The bottom of the trench shall be accurately graded to provide uniform bearing and support for each section of the pipe. Bell or coupling holes shall be made in accordance with the recommendations of the pipe manufacturer after the trench bottom has been graded. Such depressions shall be of sufficient width to provide clearance for connecting and/or bolting. Holes for depressions shall be excavated only as necessary to permit proper joining of pipe sections.

02200.3.8 SURFACE IMPROVEMENTS

When surface improvements must be removed, or are damaged or disturbed by the Work, their removal and restoration shall be accomplished by the Contractor in accordance with Sections 01510 and 02500 of these Specifications.

02200.3.9 PROTECTION OF EXISTING UTILITIES

The Contractor shall protect all existing utilities, either above or below ground, in accordance with the provisions of Section 01510 of these Specifications.

02200.3.10 IRRIGATION DITCHES, PIPES AND STRUCTURES ENT 102458:2000 PG 218 of 480

The Contractor shall contact the owners of all irrigation facilities to be encountered by the WORK and make arrangements for construction clearances and/or facility shutdown schedules. All irrigation ditches, dikes, headgates, pipe, valves, culverts, etc., damaged or removed by the Contractor shall be restored by the Contractor to their original condition, or better, in accordance with Section 02500 of these Specifications, at no additional cost to the Owner.

02200.3.11 BUILDING FOUNDATIONS AND STRUCTURES

Where trenches are located adjacent to building foundations and structures, the Contractor shall take all necessary precaution against damage to such facilities. Water settling of backfill material in trenches adjacent to structures will not be permitted unless authorized in writing by the Engineer. The Contractor shall be liable for any damage caused by the construction, and shall restore or replace damaged property in accordance with Section 02500 of these Specifications.

02200.3.11.1 SIDEWALK, CURB AND GUTTER - Where sidewalk, curb, and gutter exists, excavation may be made by tunneling provided the following requirements are met. Excavation shall be vertical and as near to the curb or sidewalk as possible. The length of the tunnel shall not exceed the width of the sidewalk, curb and gutter. Where a separate sidewalk and curb exist, an excavation shall be made between the sidewalk and the curb. At least three feet of undisturbed earth shall be left under the sidewalk. Where the excavation does not meet these requirements, a section of sidewalk from joint to joint shall be removed and replaced.

Gas Lines and Water Lines may be jacked, augured or jetted under sidewalk, curb and gutter provided the resulting hole diameter does not exceed one (1) inch plus the outside diameter of the pipe installed.

Backfill of Sidewalk Tunnels. Where the sidewalk has been tunneled, the hole shall be filled from each end with earth compacted with mechanical tampers to 90% of AASHTO T-180, Method C. A 3'-0" section of trench on each side of the tunnel and any space between the sidewalk and curb shall be backfilled with mechanically compacted earth as specified.

02200.3.12 WATER

02200.3.12.1 WATER FLOW - The Contractor's operation shall always ensure the free flow of water in gutters, culverts, and natural watercourses. In irrigated land areas, excavated materials shall be piled on the downhill sides of trenches.

02200.3.12.2 GROUNDWATER - Unless provided with geotechnical information by the Owner, the Contractor shall have the responsibility of determining the presence and location of groundwater at the Work site.

02200.3.12.3 DEWATERING - Grading and other protective measures shall be performed as necessary to prevent surface or ground water from flowing into trenches or other excavations. Any water accumulated therein during construction, from surface or from underground sources, shall be promptly removed by pumping or by other approved methods at the Contractor's expense.

Unless given as a separate item in the Bid Schedule, dewatering shall be performed at the expense of the Contractor. When geotechnical information is given, groundwater must be in excess of ± 2 feet before a change in work will be considered.

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02200.3.12.4 INSTALLATION IN WATER - No backfill, subgrade materials, concrete or masonry footings, foundations, floors, equipment, or pipe shall be placed or laid in water. Water shall not be allowed to rise over such work for at least 24 hours following the pour or placement of any concrete or mortar used in the Work. Water shall not be allowed to rise unequally against structure walls for a period of 14 days following concrete placement or masonry erection.

Groundwater or surface water in piping trenches shall not be allowed to enter and flow through the piping while installation of pipe is in progress.

02200.3.12.5 DISPOSAL - The Contractor shall dispose of all water from the Work in a suitable manner without damage to adjacent property.

02200.3.13 BEDDING AND PIPELINES

02200.3.13.1 USE OF ON-SITE MATERIALS - Unless directed otherwise in these Specifications, on-site materials complying with Section 02105 shall be used for bedding. If an act, or failure to act on the part of the Contractor creates a need to use imported bedding materials, the Contractor shall bear the cost of all additional excavation, transportation and installation for new bedding, and for removal and disposal of unacceptable materials, as required to correct that situation.

02200.3.13.2 INSUFFICIENT ON-SITE MATERIALS - When sufficient bedding material cannot be developed from on-site materials, and no provision is contained in the Contract Documents for importing bedding materials, the Engineer shall be notified as soon as possible. Alternative measures will be considered and a change can then be negotiated to provide additional materials in accordance with the General Conditions.

02200.3.13.3 BEDDING INSTALLATION - Pipe bedding shall be installed according to applicable sections of these Specifications for pipeline construction.

02200.3.14 BACKFILL

02200.3.14.1 BACKFILL MATERIALS AND PLACEMENT - Backfill shall be accomplished using acceptable materials as described in Section 02105 as follows:

- All backfill materials shall be at $\pm 2\%$ of optimum moisture content when placed in the trench or other excavation.
- Unless provided otherwise on the Drawings, consolidated trench backfill shall be placed in lifts not greater than 8 inches.
- Unsuitable excavated material, or material with incorrect moisture content shall be removed and replaced.
- Soft spongy material that causes areas which "pump" when heavy loads pass over them, shall be removed and replaced with suitable material.
- Dry material that will not "ball" shall be removed and replaced.

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(The two foregoing conditions shall be considered sufficient evidence, without further testing, that the moisture content is incorrect and shall be grounds for removal and replacement of the material. Such replacement, if required, shall be at the sole expense of the Contractor.)

- Placement of backfill against cast-in-place concrete structures shall not be started until the concrete has been cured for the time required by the Contract Documents or prescribed by the Engineer.

02200.3.14.2 COMPACTION – Compaction procedures shall be as follows:

- The Contractor shall be responsible for obtaining construction water needed for compaction in accordance with Section 02204 of these Specifications.
- Bedding and consolidated backfill material shall be compacted with tamping, vibrating or conventional wheeled compaction equipment.
- The use of wheel rolling for compaction shall only be approved for compacting unconsolidated backfill materials.
- For work within state or federal highway rights-of-way, compaction shall meet the requirements of the respective applicable specifications.
- Backfill shall be thoroughly compacted to densities not less than those shown in the following table:

TABLE OF MINIMUM DENSITY REQUIREMENTS
(based on AASHTO-99 and T-91 and on ASTM D-2922 and E-3017)

Location	From Surface to 2-Feet Below Surface	From 2-Feet Below Surface to Top of Bedding	Bedding
Within 6 feet of, and/or under, any existing or proposed structure, pavement, curb, sidewalk or similar construction included in the Contract:	100% for granular and 95% for non-granular materials	95% for all materials	95% at all locations
Around any structure outside 6 feet:	90% for all materials	90% for all materials	90% at all locations
Cultivated and landscaped areas:	85% for all materials	85% for all materials	85% at all locations
Undeveloped Land:	Unconsolidated – see definition	Unconsolidated - see definition	85% at all locations

02200.3.15 SETTLING AND SUBSIDENCE

Dips or uneven surfaces caused by subsidence or post-construction settlement of fill or backfill in any trenches, excavations, fills, or embankments within the Work, which become apparent within the warranty period, shall be repaired by the Contractor at no additional cost to the Owner.

02200.3.16 SAMPLING AND TESTING

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- 02200.3.16.1 TESTING BY INDEPENDENT LABORATORY - As directed by the Engineer, the Contractor shall provide for all sampling and testing through a qualified, independent testing laboratory at the Contractor's own expense.
- 02200.3.16.2 SCHEDULE OF SAMPLING AND TESTING - The following schedule of sampling and testing provides minimum requirements, to assure compliance with all materials and compaction requirements described herein. The number of samples and tests shown shall be considered minimum, and field conditions may necessitate additional sampling and testing to be required by the Engineer.

GRADATION DETERMINATION (AASHTO T-27 and T-11)

<u>Trench Location</u>	<u>Testing Required</u>
Materials imported or manufactured at a site determined by this contract	One test per site or source
On-site excavated materials along trenches.	One test per geographical area where material composition and gradation visually appears consistent.

MOISTURE/DENSITY RELATIONSHIP (Proctor)
(AASHTO T-99 or T-180 Method D)

<u>Trench Location</u>	<u>Testing Required</u>
Materials imported or manufactured at a site determined by this Contract.	One test per site unless the material visually appears to change.
On-site excavated materials along trenches.	One test per geographical area where material composition visually appears consistent.

COMPACTION COMPLIANCE TESTING REQUIREMENTS
(AASHTO T-191 or Portable Nuclear Gauges)

<u>Trench Location</u>	<u>Testing Required</u>
Street crossing with gravel or bituminous surfacing.	One test per lift for each crossing.
Parallel to centerline of bituminous or gravel surfaced streets or roadways.	One test per lift for each 500-feet of trench length.
Along unsurfaced roads or in cultivated or landscaped areas.	One test per lift for each 1,000-feet of trench length with at least one test per area.
Under or adjacent to manholes, wetwells, enclosures, boxes, etc.	None, unless geological conditions are inconsistent and requested by the Engineer.

NOTE: The term "test" shall mean a single test with acceptable results, equal to or better than specified minimums. In the event compaction test results fall below the required minimum density; the Contractor shall re-compact and test the material until a test with

acceptable results is obtained. Any test failure shall result in additional tests as required by the Engineer, to ensure that overall project quality objectives are met.

02200.4 METHOD OF MEASUREMENT ENT 102458:2000 PG 222 of 480

02200.4.1 NO MEASUREMENT

02200.4.1.1 SOLID ROCK EXCAVATION - Unless the Contract Documents contain provisions for "Solid Rock Excavation", no separate measurement or payment will be made for work requiring rock excavation.

02200.4.1.2 TRENCH EXCAVATION AND BACKFILL - Trench excavation and backfill will be considered incidental to other items shown in the Bid Schedule and separate measurement will not be made unless prescribed otherwise in the Contract Documents.

02200.4.2 SEPARATE MEASUREMENT

When listed as a separate item in the bid schedule, quantities of solid rock excavation shall be determined by the foot/foot unit, using a tape measure or other accurate measuring device to find the length of cut in lineal feet along the plane of cut and the average depth of cut in the rock and multiplying the two numbers together. This measurement shall include all labor, equipment, materials, and related work, including, but not limited to, ripping, sawing, boring, hammering, blasting, rock trenching, excavating, removing, hauling, and disposal, if required, of the existing bedrock deemed qualified by the Engineer for payment of completed rock excavation.

02200.5 BASIS OF PAYMENT

Separate payment will not be made for trench excavation unless prescribed otherwise in the Contract Documents.

PAYMENT ITEM	UNIT
Solid Rock Excavation	Foot/Foot

02201.1 DESCRIPTION

This section covers furnishing all equipment, labor, and other facilities to excavate, remove, backfill, compact, grade and shape earth materials required for construction of buildings, bridges, retaining walls, head walls, box culverts and other structures, in accordance with the Contract Documents.

02201.1.1 RELATED WORK

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Section 01510 - Protection of Existing Properties
 Section 02015 - Clearing and Grubbing
 Section 02105 - Earthwork Materials
 Section 02500 - Removal and Replacement of Surface Improvements
 Section 02900 - Landscaping

02201.1.2 SUBMITTALS

Not used.

02201.1.3 DEFINITIONS

Consolidated Backfill - A condition of backfilling for which a specified compaction density is required. Maximum allowable lifts for consolidated backfill under this Section shall be 8 inches unless otherwise approved by the Engineer.

Unconsolidated Backfill - A condition of backfilling for which no compaction density is specified and the required compaction effort is layer placing and then compacting by wheel rolling or use of compacting equipment. Lifts of up to 24 inches are allowed for unconsolidated backfill.

Unclassified Excavation - A determination for excavating whereby no consideration will be given to different kinds of materials that are encountered.

Embankment Fill - The placement and compaction of suitable materials to raise the existing grade to the established elevations, and the placement and compaction of suitable materials within areas where unsuitable materials have been removed. Maximum lift for embankment fill under this Section shall be 6 inches unless otherwise approved by the Engineer.

02201.2 MATERIALS

Not used

02201.3 CONSTRUCTION REQUIREMENTS

02201.3.1 PERMITS

For work within state or federal highway rights-of-way, the Contractor shall be responsible for obtaining all required encroachment and construction permits prior to beginning any work within the rights-of-way.

02201.3.2 SITE PREPARATION

02201.3.2.1 CLEARING THE SURFACE - Before proceeding with any ground surface disturbances for work under this Section, the area to be disturbed by excavation, grading or embankments shall be cleared and grubbed in accordance with Section 02015.

- 02201.3.2.2 TOPSOIL - Unless otherwise indicated, the Contractor will not be required to separate, stockpile and replace topsoil on the Work site. When required in the Contract Documents, topsoil shall be removed and stockpiled for later distribution in accordance with Section 02015.
- 02201.3.2.3 REMOVAL OF SUBSURFACE MATERIALS - Following completion of clearing and grubbing, the Contractor shall locate, and remove existing underground debris, posts, piping, cables and other underground obstructions. Unless indicated otherwise in the Contract Documents, no separate allowance for costs associated with removal of these materials will be allowed to the Contractor.
- 02201.3.2.4 RELOCATION OF UNDERGROUND UTILITIES - When required by the Contract Documents or determined necessary by the Engineer, existing underground utilities or other objects shall be relocated to provide clearance for required structural components prior to starting any structural excavation.
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- 02201.3.3 EXCAVATION
- 02201.3.3.1 UNCLASSIFIED EXCAVATION - All excavation shall be unclassified, unless otherwise indicated in the Contract Documents. The Contractor shall perform all excavation to the elevations and dimensions shown on the Drawings and/or as required to accomplish the Work.
- 02201.3.3.2 CUT SLOPES - Unless otherwise shown on the Drawings, or directed by the Engineer, cut and fill slopes, or cut slopes in soil, shall be no steeper than two horizontal to one vertical. Cut slopes in rock shall be no steeper than 1.5 horizontal to one vertical.
- 02201.3.3.3 STOCKPILING AND DISPOSAL OF EXCAVATED MATERIALS - During the excavation operations, excavated materials which are suitable for use as backfill or embankments around structures, shall be piled separately at sufficient distance from the opening to be out of the way of equipment and to prevent slides or cave-ins.
- All excavated materials not suitable, or not required, for fill or backfill shall be removed promptly from the site of the Work and disposed of in accordance with Section 01520.
- Excavated materials, regardless of their disposition, shall be piled in such manner that will cause the minimum of inconvenience to public travel, and provisions shall be made for emergency travel as necessary.
- 02201.3.3.4 SHORING AND BRACING - Shoring or bracing shall be provided in accordance with OSHA safety requirements on all excavations, to protect workmen and the progression of the Work. In addition, excavation walls shall be braced and supported as required to prevent ground collapse or movement of ground surfaces and structures adjacent to the excavation. Slides or settlements, which occur in the excavation, shall be promptly removed and corrected by the Contractor. The arrangement of shoring and bracing components shall be made so as not to place any stress on portions of completed work.
- 02201.3.4 EXCAVATION IN ROCK
- 02201.3.4.1 SOLID ROCK EXCAVATION - Demonstration of the presence of "solid rock excavation" may constitute a changed condition, and the Contractor will be compensated for removal of such material in accordance with the General Conditions. Before excavation will be considered as "solid rock excavation", the Contractor shall demonstrate an inability to remove rock by making three attempts to rip the rock using equipment having not less than 235 fly wheel horsepower with a "Kelly" or similar type ripper. After such demonstration has indicated the presence of solid rock, and the Engineer determines its removal is necessary, authorization for removal of the solid rock may be granted in accordance with Section 00700.13 of the General Conditions.

02201.3.4.2 **BLASTING** - When blasting is deemed necessary for rock removal, the Contractor shall comply with all applicable State and Local laws, ordinances, and provisions for blasting safety and obtain written approval from the Engineer prior to starting of drilling and/or blasting operations.

In all cases, blasting shall be performed by experienced, qualified blasters. The Contractor is responsible for any and all damage caused by blasting, and blasting will not be allowed within 15 feet of any existing structures.

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02201.3.5 **OVER-EXCAVATION**

02201.3.5.1 **UNAUTHORIZED OVER-EXCAVATION** - Care shall be taken not to excavate below the depth required by the Drawings. Any unauthorized over-excavation shall be refilled and compacted with material meeting the requirements of Section 02105 and approved for use by the Engineer at the expense of Contractor.

02201.3.5.2 **UNSTABLE NATIVE FORMATIONS** - The Contractor shall notify the Engineer if soft, spongy, or otherwise unstable native formations, unsuitable for structure foundations, are encountered during excavation. In the event the Engineer determines that such formations are inadequate, the Contractor will be directed to over-excavate and remove the unsuitable materials. The over-excavation shall be backfilled with approved select materials and compacted in accordance with the requirements described herein. Such situation will be considered as a changed condition and the Contractor will be compensated in accordance with the General Conditions

02201.3.6 **WATER**

02201.3.6.1 **DEWATERING** - The Contractor shall control all ground or surface water during excavation, grading and subsequent construction activities. Dewatering systems shall be provided and operated by the Contractor so as to prevent the removal of the natural soils. Grading shall be performed as necessary to prevent surface water from flowing into excavations. Any water accumulated, therein during construction, shall be promptly removed by pumping or by other approved methods at the Contractor's expense.

Dewatering efforts shall be sufficient to ensure that softening of the bottom of excavations or formation of "quick" conditions or "boils" shall be prevented. Natural or compacted materials within the excavated areas, softened by saturation with ground water or standing surface water, shall be removed and replaced as instructed by the Engineer, at no additional cost to the Owner.

02201.3.6.2 **INSTALLATION IN WATER** - No backfill, subgrade materials, concrete or masonry footings, foundations, floors, equipment, or pipe shall be placed or laid in water. Water shall not be allowed to rise over such work for at least 24 hours following the pour or placement of any concrete or mortar used in the Work. Water shall not be allowed to rise unequally against structure walls for a period of 14 days following concrete placement or masonry erection.

02201.3.6.3 **DISPOSAL** - Any water to be removed from the Work site shall be disposed of by the Contractor in a suitable manner without damage to adjacent property.

02201.3.6.4 **REFERENCE** - See also Section 02200.3.12.

02201.3.7 **SCARIFICATION**

After excavating to the lowest subgrade elevation shown on the Drawings, and prior to placement of the structure footings or foundation components, unless otherwise directed by the Engineer, the top 6 inches of the subgrade shall be scarified, brought to the proper moisture content, and compacted in accordance with the Table of Minimum Density Requirements below.

- 02201.3.8 EMBANKMENT FILL AND BACKFILL ENT 102458:2000 PG 226 of 480
- 02201.3.8.1 ON-SITE BACKFILL MATERIALS - Unless directed otherwise by the Engineer or the Contract Documents, on-site materials complying with Section 02105 shall be used for all embankment, fill and backfill materials. Before on-site material becomes unavailable, and when provisions are not included in the Contract Documents for importing suitable materials, the Contractor shall notify the Engineer so that a change can be negotiated in accordance with the General Conditions.
- 02201.3.8.2 PLACEMENT IN LIFTS - Unless provided otherwise on the Drawings, suitable embankment fill, backfill, and bedding materials shall be placed in lifts which will be not greater than 6 inches thick after compaction. Bedding. Materials shall be moisture conditioned (by wetting or drying), before being placed in layers for compaction in accordance with the requirements of the Table of Minimum Density Requirements below.
- 02201.3.8.3 UNSUITABLE FILL AND BACKFILL MATERIALS - Any unsuitable fill and/or backfill material found within excavated materials, or material with incorrect moisture content shall be removed and replaced. Soft spongy material, causing areas that "pump" when heavy loads are passed over them, shall be removed and replaced with suitable material. Dry material that will not "ball" shall be removed and replaced. The two foregoing conditions shall be considered sufficient evidence, without further testing, that the moisture content is incorrect and shall be grounds for removal and replacement of the material. Such replacement if required shall be at the sole expense of the Contractor, and shall be accomplished prior to placement of any further material.
- 02201.3.9 COMPACTION
- 02201.3.9.1 MINIMUM DENSITY REQUIREMENTS - After placement, all materials shall be thoroughly compacted to not less than the densities indicated in the table below. Compaction shall be achieved and verified in accordance with AASHTO T-99, ASTM D-1556, ASTM D-1557, ASTM D-2922 and/or ASTM D-3017 as applicable.

TABLE OF MINIMUM DENSITY REQUIREMENTS
(based on AASHTO-99 and T-91 and on ASTM D-2922 and E-3017)

Location	From Surface to 2-Foot Below Surface	From 2-Foot Below Surface to Top of Bedding	Bedding
Within 6 feet of, and/or under, any existing or proposed structure, pavement, curb, sidewalk or similar construction included in the Contract:	100% for granular and 95% for non-granular materials	95% for all materials	95% at all locations
Around any structure outside 6 feet:	90% for all materials	90% for all materials	90% at all locations
Cultivated and landscaped areas:	85% for all materials	85% for all materials	85% at all locations
Undeveloped land:	Unconsolidated - see 02201.1.3	Unconsolidated - see 02201.1.3	85% at all locations

- 02201.3.9.2 OTHER SPECIFICATIONS - For work within state or federal highway rights-of-way, compaction shall meet the requirements of the respective applicable specifications.
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- 02201.3.9.3 COMPACTION EQUIPMENT - Embankment fill and consolidated backfill material shall be compacted with conventional tamping or vibrating compaction equipment of such capacity and weight to achieve the required compaction density. The use of wheel rolling for compaction shall only be approved for compacting unconsolidated backfill materials.
- 02201.3.9.4 PLACEMENT AGAINST STRUCTURES - Embankment fill or backfilling against cast-in-place concrete structures shall not be started until the concrete has been cured for the time required by these Specifications or prescribed by the Engineer. Compaction within 3 feet of any new or existing structure shall be by hand operated vibratory or tamping equipment.
- 02201.3.9.5 CONSTRUCTION WATER - The Contractor shall be responsible for obtaining construction water needed for compaction in accordance with Section 02204.
- 02201.3.10 SETTLING AND SUBSIDENCE
Dips or settlement of fill or backfill in any excavation or embankment within the Work, which occur within the warranty period, shall be repaired by the Contractor at no additional cost to the Owner.
- 02201.3.11 SAMPLING AND TESTING
- 02201.3.11.1 INDEPENDENT LABORATORY - The Contractor shall provide all required sampling and testing by an independent qualified testing laboratory as directed by the Engineer.
- 02201.3.11.2 SCHEDULE OF SAMPLING AND TESTING - The following schedule of sampling and testing provides minimum requirements, to assure compliance with all materials and compaction requirements described herein. The number of samples and tests shown shall be considered minimum, and field conditions may necessitate additional sampling and testing to be required by the Engineer.

GRADATION DETERMINATION (AASHTO T-27 and T-11)

Location	Testing Required
Materials imported or manufactured at a site determined by this contract	One test per site or source
On-site excavated materials along trenches	One test per geographical area where material composition and gradation visually appears consistent.

MOISTURE/DENSITY RELATIONSHIP (Proctor)
(AASHTO T-99 or T-180 Method D)

Location	Testing Required
Materials imported or manufactured at a site determined by this Contract.	One test per site unless the material visually appears to change.
On-site excavated materials along trenches.	One test per geographical area where material composition visually appears consistent.

COMPACTION COMPLIANCE TESTING REQUIREMENTS
(AASHTO T-191 or Portable Nuclear Gauges)

Location	Testing Required
Under Structure footing or foundation	One test per lift for each 100 linear feet.
Within an embankment erected to support a structure under structure floor slabs	One test per lift for each 1,000 square feet.
Within embankments for cultivated or landscaped areas.	One test per lift for each 5,000 square feet.

NOTE: The term "test" shall mean a single test with acceptable results, equal to or better than specified minimums. In the event compaction test results fall below the required minimum density; the Contractor shall re-compact and test the material until a test with acceptable results is obtained.

02201.3.12

GRADING

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Upon completion of excavation, the site shall be accurately graded to the spot elevations and slopes shown on the Drawings, to allow proper installation of the structure in accordance with applicable Sections of these Specifications.

02201.4

METHOD OF MEASUREMENT

02201.4.1

NO MEASUREMENT

Separate measurement will not be made for earthwork for structures. Unless the Contract Documents contain provisions for "Solid Rock Excavation", no separate measurement or payment will be made for work requiring rock excavation.

02201.4.2

SEPARATE MEASUREMENT

When listed as a separate item in the Bid Schedule, quantities of solid rock excavation shall be determined by the foot/foot unit, using a tape measure or other accurate measuring device to find the length of cut in lineal feet along the plane of cut and the average depth of cut in the rock and multiplying the two numbers together. This measurement shall include all labor, equipment, materials, and related work, including, but not limited to, ripping, sawing, boring, hammering, blasting, rock trenching, excavating, removing, hauling, and disposal, if required, of the existing bedrock deemed qualified by the Engineer for payment of completed rock excavation.

02201.5

BASIS OF PAYMENT

Payment for earthwork for structures shall be included in the unit prices provided for the respective structure elements listed in the Bid Schedule. When listed as a separate item on the Bid Schedule, payment for "Solid Rock Excavation" will be made as follows:

PAYMENT ITEM	UNIT
Solid Rock Excavation	Foot/Foot

02202.1 DESCRIPTION

This section covers construction of roadways and embankments, roadway ditches, channel changes, furrows, slope rounding, benches, berms, dips, approaches, and subsidiary work.

02202.1.1 RELATED WORK AND REFERENCED SECTIONS

Section 02208 - Flowable Backfill (required during winter months) **EM 102458:2000 PG 229 of 480**

02202.1.2 SUBMITTALS

Not used.

02202.1.3 DEFINITIONS

Roadway - The graded portion of a road within the top of cut slopes and the toe of embankment slopes, excavated and placed to form a surface for vehicular travel.

Excavation - That portion of the roadway which is removed from its original position and deposited within the roadway as embankment.

Embankment - Excavated earth materials moved from an original source and placed within the roadway.

Unsuitable Material - Excavated earth materials determined by the Engineer to be unsuitable for placement in roadway embankment. Such materials may include rock too large for placement in embankment, topsoil containing excessive vegetative debris, unstable earth materials, etc.

Roadbed - That portion of the roadway graded to the surface upon which vehicles travel, including the shoulders.

Subgrade - The graded roadbed finished according to the details shown on the Drawings and prepared to receive surfacing when called for on the Drawings.

Borrow - Earth materials excavated from a designated source, outside the roadway, and placed in embankments within the roadway. Designated sources for borrow material shall be shown on the Drawings or elsewhere described in the Contract Documents, and shall be approved by the Engineer prior to being placed in embankment.

Pioneering - The beginning or opening of a route on which a roadway is to be constructed prior to clearing or starting any earth work excavation.

Structure Excavation - Excavation, backfill and/or disposal of material required in the roadway for construction of culverts, bridge foundations or other structures.

Cushion - Soil materials placed over rocks or solid rock portions of the roadway to provide a gradable surface. Cushion materials shall not contain rocks large than one-third of the minimum thickness of the cushion layer.

02202.2 MATERIALS

Not used.

02202.3 CONSTRUCTION REQUIREMENTS

This Work shall consist of furnishing all labor, equipment and materials for constructing a roadway, including borrow excavation, drainage excavation, removal of slide material, excavation of unsuitable material, embankment construction and disposal of all excavated material necessary for the completion of construction.

02202.3.1 CLEARING AND GRUBBING

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Clearing and grubbing shall be accomplished in accordance with Section 02015 before any excavation or embankment begins, except that grubbing of stumps when approved by the Engineer may proceed concurrently with excavation, and the removal or burning of cleared debris may be delayed until weather permits. Excavation and placement operations shall be conducted so material to be treated under Section 02015 will not be incorporated in the roadway.

02202.3.2 PIONEERING

Pioneering operations for the top of excavation slopes, toe of embankments, or pioneer road construction shall be accomplished to prevent undercutting of the final excavation slope, depositing of materials outside of the roadway limits and any restriction of drainage.

02202.3.3 UTILIZATION OF EXCAVATED MATERIALS

All suitable excavated material shall be used in the construction of embankments, subgrades, shoulders, slopes, bedding and backfill for structures and for other purposes as shown on the Drawings and as described below:

02202.3.3.1 EXCESS EXCAVATION - Designed excess excavation shall be disposed of as shown on the Drawings.

02202.3.3.2 ROCK FOR SLOPE PROTECTION - When approved by the Engineer, excavated rock suitable for protection of embankments may be conserved and used in lieu of a designated materials source.

02202.3.3.3 CONSERVING MATERIAL - Material encountered in the excavation, suitable for cushion, road finishing or other purposes, may be conserved and utilized instead of materials from designated sources.

02202.3.3.4 EXCAVATION OF UNSUITABLE MATERIAL - Unsuitable material shall be excavated. Disposal will be as shown on the Drawings. Excavated areas shall be backfilled with suitable material when necessary to complete the Work. Frozen material shall not be placed in embankments. Rocks that are too large to be incorporated into the embankment shall be broken for incorporation into the embankment or maneuvered to the face of the embankment and embedded so that they will not roll or obstruct the use and maintenance of the roadbed, or moved to locations approved by the Engineer.

02202.3.3.5 CONSERVATION OF TOPSOIL - When indicated on the Drawings, suitable topsoil shall be removed, transported, and deposited in the designated stockpile areas.

02202.3.3.6 ABANDONED STRUCTURES AND OBSTRUCTIONS - Abandoned structures and obstructions shall be treated in accordance with Section 02500.

02202.3.4 DRAINAGE EXCAVATION

Drainage excavation shall include construction of side ditches, minor channel changes, inlet and outlet ditches, furrow ditches, ditches constructed along the road but beyond the roadway limits and

other minor earth drainage structures as shown on the Drawings. Excavated material shall be utilized in accordance with subsection 02202.3.3 above.

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02202.3.5 FINISHING ROADBED

02202.3.5.1 OVERSIZE MATERIALS - For roads receiving aggregate base or surface course, only rocks that do not protrude above the subgrade more than one-third of the depth of the base or surface course or 3-inches, whichever is less, may remain in place.

For unsurfaced roads, unless otherwise shown on the Drawings, the top 4-inches below the finished road surface shall not contain rocks larger than 4-inches in greatest dimension. Oversize material shall be removed, reduced to acceptable size or covered by importing suitable material approved by the Engineer.

02202.3.5.2 SHAPING AND DRESSING - The subgrade shall be visibly moist during shaping and dressing. Low sections, holes, cracks or depressions shall be brought to grade with suitable material approved by the Engineer. Final compaction of the subgrade shall meet the requirements of the embankment placing method specified.

02202.3.6 SNOW REMOVAL

Snow and/or ice shall not be incorporated into the embankment. Snow shall be removed in advance of the work to be performed and shall be deposited beyond the roadway limits in a manner that will not result in erosion or waste material.

02202.3.7 FINISHING SLOPES

02202.3.7.1 SLOPE SURFACE - Slopes shall be finished as closely as is practicable to the lines staked on the ground or shown on the Drawings. The finished slope shall be left in a slightly roughened condition to facilitate the establishment of vegetative growth. The finish associated with template and stringline or hand-raking methods will not be allowed. Loose rock, loose debris and other loose material, each of which is large than 6-inches in diameter, shall be removed from the slope unless otherwise shown on the Drawings.

02202.3.7.2 SLOPE TOP - The tops of excavations, excluding areas of solid rock, shall be blended with the adjacent terrain by rounding when shown on the Drawings. Decomposed rock that may be cut without blasting or ripping shall be rounded. Earth overlying rock shall be rounded above the rock.

02202.3.8 BLASTING

02202.3.8.1 CONTROLLED BLASTING - All rock excavations that require blasting shall be formed with controlled blasting techniques unless otherwise shown on the Drawings. Controlled blasting is defined as the controlled usage of explosives and blasting accessories in appropriately aligned and spaced drill holes for the purpose of producing a free surface or shear plane in the rock excavation slopes and of minimizing landscape damage, adjacent ground vibration and overbreak. Presplitting is not intended unless shown on the Drawings and described in the Contract Documents.

02202.3.8.2 TEST SECTIONS - Unless directed otherwise by the Engineer, the Contractor shall drill, blast and excavate short test sections (not to yield in excess of 1,000 cubic yards) to determine the controlled blasting method, hole spacing and charge best suited to the material encountered.

02202.3.9 OVERBUILDING

Unless otherwise agreed to by the Engineer, excavation or embankment material shall be confined within the roadway limits to avoid overbuilding and to protect the adjacent property.

02202.3.10 SUBGRADE TREATMENT

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02202.3.10.1 TREATMENT MATERIALS - Subgrade treatment shall consist of soil modification by mixing aggregates, placing geotextiles, fiber mat, rock blanket or other similar materials over areas of unsuitable embankment foundation material that will be indicated on the Drawings. The construction and material requirements for the subgrade treatment will be specified in the Contract Documents.

02202.3.10.2 SWAMPY GROUND - When an embankment is to be placed across swampy ground and removal of unsuitable material or subgrade treatment is not required, the lower part of the embankment may be constructed in a single layer to the minimum depth necessary to support construction equipment.

02202.3.11 EMBANKMENT PLACEMENT

All embankments shall be placed by one or more of the following methods as shown on the Drawings and listed in the Bid Schedule.

02202.3.11.1 METHOD 1 - SIDE CASTING AND END DUMPING - Embankment may be placed by side casting and end dumping. Where material containing a large amount of rock is used to construct embankments, a solid embankment shall be provided by working smaller rocks and fines in with the large rocks and fines to fill the voids.

02202.3.11.2 METHOD 2 - LAYER PLACEMENT - Surfaces steeper than a ratio of 3 horizontal to 1 vertical (3:1) upon which embankment is to be placed, shall be roughened or stepped when shown on the Drawings to provide permanent bonding of new and old materials.

- Embankment shall be layer placed, except over rock surfaces, in which case material may be placed by end-dumping to the minimum depth needed for operation of spreading equipment. Each embankment layer shall be leveled and smoothed before placement of subsequent layers. Hauling and spreading equipment shall be operated uniformly over the full width of each layer.
- Suitable material shall be placed in layers no more than 12-inches thick, except when the material contains rock more than 9-inches in diameter, in which case layers may be of sufficient thickness to accommodate the material involved. No layer shall exceed 24-inches before compaction.
- Placing individual rocks or boulders greater than 24-inches will be permitted provided the embankment will accommodate them. Such rocks and boulders shall be at least 6-inches below subgrade. They shall be carefully distributed and the voids filled with finer material to form a dense and compacted mass.
- Where material containing large amounts of rock is used to construct embankments, the layers may be of sufficient thickness to accommodate the material involved. A solid embankment with adequate compaction shall be constructed by working smaller rock and fines in with the larger rocks to fill the voids and by operating hauling and spreading equipment uniformly over the full width of each layer as the embankment is constructed.
- Material shall be at a moisture content suitable to obtain a mass that will not visibly deflect under the load of the hauling and spreading equipment. Excessively wet excavated material shall be handled in accordance with Subsection 02202.3.3.1.

02202.3.11.3 METHOD 3 - LAYER PLACEMENT (ROLLER COMPACTION) - Embankments shall be placed as specified in Method 2. Placement shall be in horizontal layers not exceeding 12-inches prior to compaction, except when the material contains rock more than 9-inches in diameter, in which case layers may be of sufficient thickness to accommodate the material involved. Compaction shall be

obtained with equipment in compliance with the requirements described in the Specifications. Compaction equipment shall be operated over the full width of each layer until visible deformation of the layer ceases or, in the case of the sheepfoot roller, the roller "walks out" of the layer. At least three complete passes will be made.

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02202.3.11.4 METHOD 4 - CONTROLLED COMPACTION - Embankments shall be placed as specified in Method 2 except earth embankments shall be placed in horizontal layers not exceeding 12-inches (loose measure) and compacted. Material shall be at a moisture content suitable for attaining the required compaction. Embankments and the top 1-foot of excavation sections shall be compacted to at least 95 percent of the maximum density as determined by AASHTO T 180, Method C or D.

- The density of the embankment material shall be determined during the progress of the Work in accordance with AASHTO T 191, T 205 or T 238; T 217, T 239 or T 255; and T 224.
- Density requirements will not apply to portions of rock embankments that cannot be tested in accordance with approved methods. When this condition exists, compaction shall be provided by working smaller rocks and fines in with the larger rocks to fill the voids and by operating equipment over the embankment materials.

02202.3.12 COMPACTION EQUIPMENT

02202.3.12.1 EQUIPMENT - Compaction equipment shall be capable of obtaining compaction requirements without detrimentally affecting the compacted material. The compacting units may be any one of the types described herein, provided they are capable of compacting each lift of material as specified and meet the minimum requirements contained herein.

02202.3.12.2 ROLLER REQUIREMENT - Minimum requirements for rollers are as follows:

- Sheepfoot, tamping or grid rollers shall be capable of exerting a force of 250 pounds per inch of width of roller drum.
- Steel-wheel rollers, other than vibratory, shall be capable of exerting a force of not less than 250 pounds per inch of width of the compression roll or rolls.
- Vibratory steel-wheel rollers shall have a minimum weight of 6 tons. The compactor shall be equipped with amplitude and frequency controls and specifically designed to compact the material on which it is used.
- Pneumatic-tire rollers shall have smooth tread tires of equal size that will provide a uniform compacting pressure for the full width of the roller and capable of exerting a ground pressure of at least 80 psi.

02202.3.13 CONSTRUCTION TOLERANCES

Unless provided otherwise herein, a specific tolerance class for allowable deviation from construction stakes and Drawings shall be shown on the Drawings. A Table of Tolerance is provided below:

TABLE OF TOLERANCES

MEASUREMENT		TOLERANCE CLASS		
		A	B	C
Roadbed	Width	+0.5	+1.0	+2.0
(feet) Subgrade	Elevation	+0.1	+0.2	+0.5
(feet) Centerline		+ 0.2	+ 0.5	1.0

Alignment (feet)

Deviations shall be uniformly graded in the direction of change for a distance of 200-feet or more along the roadway. Roadway ditches shall always be constructed to flow in the direction shown on the Drawings, regardless of allowable deviations. Roadbed width shall be no less than the dimension shown on the Drawings or staked in the field. When a tolerance class is not otherwise indicated on the Drawings, Class B tolerance deviations will be allowed for roadway construction.

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WATER

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Water provided for compaction, dust control, or planting and care of vegetation, shall be developed, hauled and applied in accordance with Section 02204.

02202.4

METHOD OF MEASUREMENT

02202.4.1

ROADWAY EXCAVATION

02202.4.1.1

SEPARATE MEASUREMENT - When shown as a separate item on the Bid Schedule, quantities of roadway excavation, in cubic yards, shall be determined, for undisturbed material in its original position on the ground, as measured by slope staking performed before the start of construction. Unless shown otherwise herein, measurement for roadway excavation shall include the following:

- All loosening, loading, transportation, spreading, compaction and grading required to achieve the staked grades and alignment.
- Material excavated below the required grade and beneath embankment areas when shown on the Drawings or directed by the Engineer.
- Ditches located outside of the roadway, except when they are included as an item on the Bid Schedule.
- Topsoil or other material removed and stockpiled as directed, when not measured as a separate pay item.
- Borrow material used in the Work, except when borrow is included in the Bid Schedule.
- Slide material not attributable to the negligence of the Contractor.
- The volume of materials taken from stockpiles and used in the Work, except materials included in other pay items.

02202.4.1.2

NO MEASUREMENT - Measurement for roadway excavation shall not include the following:

- Material used for other than approved purposes.
- Unauthorized excavation or borrow.
- Quantity of material excavated from slope rounding.
- Overbreakage from the backslope in rock excavation requiring blasting.
- Material scarified in place to receive the first layer of embankment.
- Benching or stepping existing ground for embankment foundation.

- Stepping or scaling cut slopes.
- Oversize material removed when finishing unsurfaced roads.

02202.4.2 ROADWAY EMBANKMENT

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When shown as a separate item in the Bid Schedule, measurement of quantities for roadway embankment will be by the cubic yard as determined from slope stake information taken prior to construction, for materials in place, compacted, and accepted. Unless shown otherwise herein, measurement shall include all loosening, loading, transportation spreading, compaction and grading required to achieve the staked grades and alignments.

02202.4.3 ROADWAY BORROW

When shown as a separate item in the Bid Schedule, quantities for roadway borrow, calculated in cubic yards, shall be measured by comparing preliminary cross-sections of the material on the undisturbed ground to other cross sections taken following its removal. Measurement shall include all loosening, loading and transportation to the location of the embankment designated for deposit.

02202.4.4 WATER

02202.4.4.1 NO SEPARATE MEASUREMENT - Unless shown as a separate item in the Bid Schedule, no separate measurement shall be made for water required for compaction, handling or other purposes associated with earthwork excavation and embankment.

02202.4.4.2 SEPARATE MEASUREMENT - When included as a separate item, measurement will be made in accordance with Section 02204.

02202.4.5 TOPSOIL

When topsoil stripping and stockpiling is included as a separate item in the Bid Schedule, measurement will be by the cubic yard placed in stockpiles at designated locations shown on the Drawings or directed by the Engineer. Measurement shall include loading, transportation and placement into stockpiles at designated locations.

02202.4.6 TOPSOIL SPREADING

When topsoil spreading is included as a separate item in the Bid Schedule, measurement will be by the square yard of surface on which the material is spread at a depth indicated in the Drawings. Such measurement shall include loading from a stockpile or designated source, transporting and spreading to the required depth.

02202.5 BASIS OF PAYMENT

The accepted quantities will be paid for at the contract unit price for:

PAY ITEM	UNIT
Roadway Excavation (Placement Method)	Cubic Yard
Roadway Borrow (Placement Method)	Cubic Yard
Roadway Embankment (Placement Method)	Cubic Yard
Subgrade Treatment (Type)	Square Yard
Drainage Excavation (Type)	Lineal Foot
Drainage Excavation (Type)	Cubic Yard
Topsoil (Stripped & Stockpiled)	Cubic Yard
Topsoil (Spread)	Square Yard

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02208.1 DESCRIPTION

Furnish and place flowable fill for backfill in roadway trenches.

02208.1.1 MATERIALS

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Cement – Use Portland Cement, Type I or II

Fly Ash – Loss on ignition must be 3% or less.

Fine Aggregate

Natural Sand

Meet the following gradation when test is specified.

Table 02208.1.1	
Sieve Size	Percent Passing
No. 3/4	100
No. 100	0-10

02208.1.1 MIX DESIGN

Meet the following requirements.

Mix design compressive strength (28-day) – between 50 to 150 psi.

Portland Cement – at least 50 pounds/cubic yard

Fly Ash – at least 300 pounds/cubic yard

Slump – 6-10 inches maximum

02208.1.1 FINISH

Finish to a flat surface.

02222.1 DESCRIPTION

This section covers furnishing and installation of pipe and fittings of the type, class and size designated for the water system defined on the Drawings, in these Specifications, and elsewhere in the Contract Documents.

02222.1.1 RELATED WORK

Section 02105 - Earthwork Materials
 Section 02200 - Trench Excavation and Backfill
 Section 15110 - Pipe and Piping Systems
 Section 15230 - Waterline Valves and Hydrants
 Section 15232 - Water System Control Valves
 Section 15234 - Water Service Connections
 Section 15236 - Water Main Flow Meters

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02222.1.2 SUBMITTALS

02222.1.2.1 MATERIALS AND EQUIPMENT - The Contractor shall submit for review complete information, showing all pipe, materials, fittings, gaskets, couplings, coatings, linings, supports, mechanical restraints, thrust blocks and configuration prior to the delivery of any components to the project. All information shall be provided in accordance with Section 01300 and written evidence of compliance from the manufacturer shall be provided with each delivery of material.

02222.1.2.2 TESTING - As construction proceeds, the Contractor shall submit test documentation in accordance with this section of these Specifications.

02222.1.3 DEFINITIONS

Fitting - Any component of a pipeline, excluding the pipe itself and valves and meters, which is used for connecting pipe sections; changing line direction or size; connecting meters, valves, tanks, etc.; or starting or terminating pipelines.

Mains - Water distribution pipes, located in streets or rights-of-ways, to which water service connections are made for users of the system.

Run - Any identified section of a pipeline.

Saddle - A fitting placed on a pipe to reinforce the pipe wall, through which a tapping hole is drilled.

Service Lateral - The line which connects to the water meter or to the service stub at the property line extending from there, on private property, to the plumbing at the foundation of a house or business.

Service Stub - The line running from the tap on a main to the meter or to the property line as appropriate.

Tap - The actual connection made to water mains which includes drilling an opening into the main, threading, installing a tapping saddle when appropriate, and installing a valve into the opening.

02222.2 MATERIALS

02222.2.1 PIPE AND FITTINGS

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See Section 15110

02222.2.2 PIPELINE LOCATION IDENTIFIERS

Pipeline location identifiers generally take the form of marker posts, warning tape, and tracer wire.

02222.2.2.1 TRACER WIRE - Unless otherwise described on the plans or herein, the tracer wire shall be an insulated, #12, direct bury copper wire designed and manufactured for this purpose.

02222.2.2.2 WARNING TAPE - The warning tape shall be an inert, plastic, direct bury type with a 2-inch minimum width, of the appropriate safety color, and specifically manufactured for underground utility identification. The tape shall have wording imprinted on it identifying the type of utility it is protecting.

02222.2.2.3 MARKING POSTS - Shall be fiberglass compound, aluminum, or other corrosion resistant metal of the length and size shown on the Drawings. They shall be fitted with a deterioration resistant warning notice or label appropriate to the application.

02222.2.3 MISCELLANEOUS FITTINGS AND MATERIALS

02222.2.3.1 POLYETHYLENE ENCASUREMENT - Where soil conditions are determined to be severely corrosive and when shown on the Drawings or required in the Contract Documents, tubular polyethylene encasement shall be installed around buried ductile iron piping and fittings in accordance with ANSI/AWWA C-105.

02222.2.3.2 CASING PIPE - Where casing pipe is called for on the Drawings or is required by the Engineer, the Contractor shall furnish and install the casing in accordance with Sections 02315 and 02320 of these specifications.

02222.2.3.3 PIPE PENETRATION OR CASING SEALS - Where required on the Drawings or in these Specifications, the Contractor shall furnish and install pipe-to-wall linked rubber seals in core drilled structures, walls, pipe sleeves, or casings in accordance with the manufacturer's instructions. Seals shall be link seals by Thunderline Corporation, or an approved equal.

02222.2.3.4 PIPE RESTRAINTS - Pipe restraints shall be as follows:

- Concrete thrust blocking shall be formed, sized, and placed as described herein and shown on the Drawings. Reinforcing bars used in thrust block construction shall be preformed and fusion bonded epoxy coated.
- Mechanical restraint of piping shall be accomplished with one of the following restraining systems or an approved equal:
 - ⇒ Grooved Ductile Iron AWWA Couplings by Victaulic Company of America (use only with exposed piping systems).
 - ⇒ MEGALUG thrust restraints by EBAA Iron Sales, Inc.

⇒ FIELDLOK restraint gaskets by U.S. Pipe Company. Without the written approval of the Engineer, use of this restraint device is limited to joints in carrier pipe installed in a casing pipe.

All joints of pipe installed under streambeds or canal crossings, or installed in casing pipes, shall be protected with mechanical restraint.

Restraint protection of above ground or exposed piping in buildings or enclosures shall be accomplished only with mechanical restraints.

02222.3 CONSTRUCTION REQUIREMENTS

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02222.3.1 HANDLING AND APPROVAL OR REJECTION OF MATERIALS

All materials delivered to and used at the job site are subject to approval of the Engineer or the Owner. Care shall be taken during handling of pipe, to avoid any impact which might cause damage. Dropping pipe during unloading will not be permitted. Pipe will be carefully inspected in the field before and after laying. If any cause for rejection is discovered in a pipe before or after laying, it shall be removed and replaced by the Contractor, at no additional cost to the Owner. Any pipe found to be unfit or rejected due to cracks, broken bells or spigots, irreparable chipped lining, etc., shall be removed from the job site.

02222.3.2 DIAGRAMMATIC LAYOUT

Piping layout on the Drawings shall be considered diagrammatic for all piping not shown with detailed dimensions. When this is the case, pipe size and location are provided, but the Drawings are not intended to show every offset, fitting, or structural difficulty that will be encountered during project construction.

02222.3.3 ALTERATION OF ALIGNMENT

At no additional cost to the Owner, and with written permission from the Engineer, piping alignment may be varied from that shown on the Drawings, to avoid structural or mechanical difficulties, or to avoid the work of other trades. The Contractor still will be liable to provide all materials and labor required to complete all work in accordance with the best practice of the trade, and to the satisfaction of the Engineer.

02222.3.4 INSTALLATION

02222.3.4.1 DEWATERING - Prior to pipe laying and jointing, sufficient dewatering effort shall be provided to maintain the ground water level at or below the surface of the trench bottom or base of the bedding course. The dewatering operation; however accomplished, shall be carried out in such a manner as to not permanently disturb natural underground water conditions.

02222.3.4.2 CONNECTION TO EXISTING FACILITIES - When connections are to be made to any existing pipe or appurtenances, for which the actual elevation or position cannot be determined without excavation, the Contractor shall excavate for, and expose the existing pipe or appurtenances before laying any new pipe. The Engineer shall be allowed to inspect the existing pipe or appurtenances before any connection is made. The Contractor shall make any adjustments in line or grade which may be necessary to accomplish the intent shown on the Drawings.

Where new fittings, valves, meters, restraints etc., are required to be installed in, or attached to, existing piping, or where connections are to be made to existing piping, the Contractor shall

furnish and install the necessary components needed to accomplish the work, whether or not specifically indicated on the Drawings.

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02222.3.4.3 CAPPING PIPE END - At the close of each workday, or whenever the work ceases for any reason, the end of the pipe shall be securely closed, unless otherwise permitted by the Engineer.

02222.3.4.4 JOINING - Joining of pipe shall be as follows:

- When making connections, pipe shall be cut and beveled in a neat and workmanlike manner, so as to provide a smooth, beveled end at right angles to the axis of the pipe. Pipe and fittings shall be assembled so there will be no distortion or springing of the pipelines. Flanges, unions, flexible couplings and other connections shall come together at the proper orientation. The fit shall not be made by springing any piping, nor shall orientation or alignment be corrected by taking up on any flange bolts. Flange bolts, union halves, flexible connectors, etc., shall slip freely into place. If the proper fit is not obtained, the piping shall be altered to fit.
- PVC pipe, 2 inches and smaller in diameter, shall be joined by solvent welding. No disturbance of joints, including from trench backfill operations, will be allowed until solvent welded joints are cured.
- PVC pipe, larger than 2 inches in diameter, shall be joined by means of gasketed joints.
- With bell and spigot joints, care should be taken to properly align the pipe before joints are forced home. Gaskets shall be lubricated in accordance with manufacturer's instructions. During insertion of the spigot end, the pipe shall be partially supported by hand, sling, or crane to minimize unequal lateral pressure on the gasket and to maintain concentricity until the gasket is properly positioned. Since the most flexible gasketed joints tend to creep apart when the end pipe is deflected and straightened, such movement shall be held to a minimum once the joint is home.
- Where fusion of polyethylene pipe joints is required, sections of pipe shall be joined in a continuous length on the job site above ground. Joining shall be by the butt fusion method and shall be performed in strict accordance with the pipe manufacturer's recommendations. Equipment used for butt fusion joining shall be capable of meeting all conditions recommended by the pipe manufacturer, including, but not limited to, temperature requirements, alignment, and fusion pressures.

02222.3.4.5 LAYING - All pipe laid shall be retained in position, using mechanical means if necessary, so as to maintain alignment and joint closure until sufficient pipe bedding and backfill have been completed to adequately hold the pipe in place. All pipe shall be laid to conform to the prescribed line and grade shown on the plans, within specified limits. No blocking of any kind shall be used to adjust the pipe to grade, except when used with concrete embedment. Bedding materials shall be placed so the bottom surface of the pipe will have full bearing for the entire barrel length. The pipe shall rest on not less than 1/4 of its outside perimeter. Bell holes shall be dug as required to assure uniform support along the barrel but shall be no larger than necessary.

Unless otherwise approved by the Engineer, pipe shall be laid upgrade from the point of connection on the existing pipeline or from a designated starting point. Pipe shall be installed with the bell end forward or upgrade, unless approved otherwise. When pipe laying is not in progress, the forward end of the pipe shall be kept closed with an approved temporary plug.

02222.3.4.6 PIPE RESTRAINT - Pipe restraint work shall be as follows:

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- The Contractor shall provide and install either concrete thrust blocks or mechanical pipe restraints on all pressure piping not connected with bolted flanges or welded joints.
- For projects involving pipeline construction covered under this section of the Specifications, a pipe restraint schedule is included in the Drawings. Pipe restraints (thrust blocks and/or mechanical restraints) shall be furnished and/or constructed and installed as shown on the Drawings and described in the schedule.
- Pressure pipe shall be properly blocked or restrained at all fittings, wherever the pipeline makes a change in direction of 11.25 degrees or more, wherever it changes sizes, or wherever it ends.
- Placement of concrete thrust blocking shall provide bearing against undisturbed vertical earth banks or approved compacted backfill, sufficient to absorb thrust from line pressure, and in a configuration so that pipe joints and fittings will be accessible.
- All restraints shall be in place before any hydrostatic testing and flushing are performed on the system.
- The Contractor shall allow visual inspection of every thrust block or mechanical restraint before it is buried.

02222.3.4.7 FINISH BEDDING - After the pipe is laid, additional bedding material shall be placed in 6-inch lifts to a level even with the spring line of the pipe and compacted. The portion of the trench from the spring line to 12 inches above the top of the pipe shall then be filled and compacted in the same way.

02222.3.4.8 REQUIREMENTS FOR INSTALLATION NEAR SEWER LINES - Locate potable water piping at least 10 feet horizontally (measured edge to edge) from any existing or proposed parallel sewer or wastewater leach line. Should conditions prevent the 10-foot separation, the water line may be laid closer than 10 feet to sewer lines (but not leach lines) provided:

- The water line is laid 18 inches above the top of the sewer line, but deep enough to prevent freezing, and
- The water line is laid in a separate trench, or
- The water line is laid on an undisturbed earth shelf on one side of the sewer line trench, or
- The water line is laid in a sewer or drain line trench, which has been backfilled and compacted to not less than 95% of maximum density, as determined by ASTM D-690.

Where potable water lines cross sewer lines, the bottom of the water line shall be at least 18 inches above the top of the sewer line for ten feet on each side of the sewer line, measuring perpendicularly from the water line to the sewer line. When such vertical separation is impossible to achieve, a vertical separation of less than 18 inches may be allowed provided:

- In new construction for both water line and sewer line they shall be constructed of ductile iron pipe or thermoplastic pipe joined by either mechanical or bolted flange joints. Thermoplastic pipe may also use solvent welded joints. In situations with an existing sewer line, the new water line shall be constructed as previously described.

- And, when making such crossing, install the water line in such manner that the center of a full length of pipe is on the centerline of the sewer line to isolate the water line joints as far as possible from the sewer line.

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02222.3.4.9 EXPOSED PIPING - No exposed piping shall be installed until all equipment to which the pipe is to be attached has been installed and it can be determined where piping and fittings shall be located to make a neat, efficient arrangement. Piping shall be aligned with equipment connections such that no external load or stress will be transferred to any equipment from the piping. Piping shall be installed with a sufficient number of unions, flexible couplings, or flanged joints, in addition to those shown on the Drawings, to allow for convenient inspection and maintenance.

Exposed pipe work shall be suspended or supported, to prevent sagging or over-stressing of the pipe and connections. Assembly of pipe and fittings shall be accomplished so there will be no distortion or springing of the pipe. The fit shall not be made nor the alignment corrected by taking up on any flange bolts. Joints shall come together in proper orientation, and Flange bolts, union halves, flexible couplings, and etc. shall slip freely into place. If the proper fit is not obtained, the piping shall be altered to make the fit meeting the above requirements.

Exposed pipe shall be installed in straight runs parallel to the axis of the structures. Pipe runs shall be horizontal and vertical; except that gravity drain lines shall be pitched down in the direction of flow at a slope not less than 1/8 inch per foot.

All exposed pipe shall be painted in accordance with Section 09010 of these Specifications. Factory finished items are not required to be field painted except touch-up. The color and type of paint used shall be submitted to the Engineer for his approval.

02222.3.4.10 DRAINS AND OTHER SYSTEMS - In addition to other requirements in this Section, all irrigation and other lines fitted with drains shall be installed such that continuous slope is maintained to designated drain locations. In areas where there are both culinary water pipelines and irrigation pipelines, exposed portions of irrigation water piping shall be identified by distinctive coloring or other marking. Culinary and irrigation lines and extensions shall be completely separated, installed in separate trenches, and there shall be no cross-connection between the systems under any circumstances.

02222.3.5 FLUSHING AND CLEANING

02222.3.5.1 FLUSHING WITH WATER - Prior to proceeding with pressure testing (and/or disinfection if required) of completed lines, the Contractor shall fill the test section with clean, potable water and flush the lines. The Contractor shall furnish all equipment and labor to complete the flushing as required by this section. Water for flushing shall be provided by the Owner.

02222.3.5.2 DIFFICULT CONTAMINANTS - Certain contaminants, especially in caked deposits, resist flushing at any velocity. If, in the opinion of the Engineer, such contaminants have entered the line during construction, the interior of the pipe shall be swabbed, as necessary, to remove the debris prior to proceeding with flushing.

02222.4.5.3 MINIMUM FLUSHING FLOW AND VELOCITY - The Contractor shall make all arrangements, to establish a minimum 2.5 feet per second (fps) flow velocity in the line during the flush. Flushing shall proceed until the installed pipe is free of debris. The flows needed to produce the required flushing velocity indicated above are provided in the table below.

FLUSHING FLOW AND VELOCITY

Pipe Diameter (inches)	Flow (gpm) to Produce 2.5 fps
4	100
6	200
8	400
10	600
12	900
16	1600

NOTE: With 40 psi residual pressure, 2 1/2 inch and 4-1/2 inch hydrant outlet nozzles will have the ability to discharge approximately 1,000 GPM and 2,500 GPM respectively.

02222.3.6

TESTING

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The Contractor shall perform all testing, and shall furnish all materials, equipment, and labor necessary to complete this work as required. Any work that fails to meet the acceptance criteria of prescribed testing shall be repaired and/or replaced at no additional cost to the owner. All repaired work shall be re-tested. This sequence shall be repeated until the work meets the acceptance criteria.

02222.3.6.1

PRESSURE TESTING - All pipelines constructed for carrying potable, non-potable, and water-borne products shall be pressure tested for leakage when they are completely assembled, unless directed otherwise in these Specifications or in writing by the Engineer.

WARNING - The hydrostatic test procedures described herein are not applicable to air pressure testing.

Prior to pressurization, all required flushing shall have been completed. Pipeline sections to be tested shall be isolated from any connecting lines. Air release taps shall be provided at points of highest elevation, the test section shall be filled with clean potable water, and all air shall be removed from the line. Pressure on the test section shall then be brought to full test pressure and maintained at that level for a period of not less than 4 hours. Pipelines shall be tested at 50 psi over normal static pressures shown on the Drawings or to the manufacturer's class rating, whichever ever is lower. Permanent plugs shall be inserted into the air release tap holes after the test has been completed.

02222.3.6.2

LEAKAGE TESTING - The leakage test shall be conducted concurrent with the pressure test. Amount of leakage, if any, will be determined by measuring the quantity of additional water required to maintain the prescribed hydrostatic pressure test during the test period. Accurate means shall be provided to measure the quantity of water required to maintain full pressure on the line for the 4 hour test period, the measured leak rate shall not exceed the rate "L" computed as follows:

$$L = SD(P^{0.5})/133,200$$

where:

- L = Leakage rate (gal/hour)
- S = Length of tested pipe (feet)
- D = Nominal diameter of pipe (inches)
- P = Average test pressure (psi)

When the allowed amount of leakage is exceeded, leaks shall be located and repaired and the system shall then be re-tested by the Contractor until compliance is achieved.

All visible leaks in exposed pipe shall be repaired. ENT 102458:2000 PG 245 of 480

02222.3.6.3 OPERATIONAL TESTING (*pressurized irrigation only*) - Pressurized irrigation systems shall be tested for proper system operation after backfill is in place and sprinkler heads have been adjusted to final position. This test shall demonstrate that the system meets coverage requirements (based on operation of one circuit at a time) and that all automatic controls function properly.

02222.3.6.4 NON-RIGID PIPE DEFLECTION TESTING - At the Engineer's request, the Contractor shall test requested portions of all non-rigid pipe after being installed and backfilled to ensure that circumferential deflection does not exceed 5% of the diameter. Such test will consist of passing a mandrel through an open section of pipe, sized appropriately to detect non-compliance. The mandrel shall be sized in accordance with the requirements provided in Section 02224 for checking sewer pipe. In the event deflection non-compliance is found, the Contractor shall make repairs as outlined in Section 02224 and additional testing of other sections of pipe will be requested.

02222.3.6.5 TESTING DOCUMENTATION - The Contractor shall maintain a record of all testing performed, together with the test results obtained, for each line installed under this Contract. Minimum information to be included in these records shall be as follows:

- All Documents:
 - Date of issuance of the record
 - Name of Contract
 - Contractor's name and address
- Disinfection Report: (See also Subsection 02222.3.7 Below)
 - Name and address of treatment supervisor
 - Disinfection method used
 - Location and boundary description of section to be disinfected
 - Time and date of disinfectant introduction
 - Time and date of disinfectant release
 - Initial disinfectant residual (PPM) for each outlet tested
 - Time and date of flushing after disinfection
 - Signature of treatment supervisor (signifies completion of disinfection activities)
- Bacteriological Report:
 - Date issued
 - Project name and location
 - Laboratory's name, certification number, address and phone number
 - Test location
 - Time and date of sample collection
 - Name of person collecting sample
 - Time and date of laboratory test start
 - Coliform bacteria test results for each sample
 - Certification that water conforms (or fails to conform) to bacterial standards of the appropriate state public drinking water regulations
 - Bacteriologist's signature
- Test Report:
 - Type of test

- Location of test
- Sizes, types, and lengths of pipe in test section, and test boundary description
- Date and Time test started
- Date and Time test completed
- Test pressure (*Pressure Test only*)
- Amount of leakage/allowable leakage (*Pressure Test only*)
- Mandrel dimensions (*Obstruction and Non-Rigid Pipe Deflection Tests only*)
- Test result (*pass/fail*) (*All Tests*)
- Printed Name/Signature and Date of Test Supervisor (Contractor's representative) (*All Tests*)
- Printed Name/Signature of Inspector (Engineer's representative) witnessing and approving the test (*All Tests*)

02222.3.7 DISINFECTION

02222.3.7.1 REGULATORY COMPLIANCE - All pipelines to be used for culinary water service shall be disinfected in accordance with the requirements of state and local public drinking water regulations.

02222.3.7.2 METHODS - The Contractor may use any method which complies with the above referenced standards; however, the "slug method", prescribed in ANSI/AWWA C-651, is preferred. This method basically consists of filling the line with potable water and then injecting a "slug" of concentrated chlorine solution (100 mg/L) at the upstream end of the line. The "slug" is then moved through the line by slowly draining the low end. When properly conducted, this procedure provides contact to the interior pipe surfaces with a heavily concentrated dose of chlorine to achieve disinfection.

02222.3.7.3 FLUSHING - After disinfection, the lines shall be flushed until residual chlorine is reduced to the levels safe for consumption. Samples for bacteriological testing can then be taken. The Contractor shall safely and legally dispose of contaminated water used for disinfection after consultation with the local authorities. Under no circumstances shall heavily chlorinated water be allowed to mix with "live" waters, meaning waters in lakes, rivers, streams or wetlands.

02222.3.8 PIPELINE LOCATION IDENTIFIERS

The Contractor shall furnish and install such identifiers as shown on the Drawings and/or prescribed in these Specifications.

02222.3.8.1 TRACER WIRE - Tracer wire shall always be installed in the trench with non-metallic pipelines, during or immediately following their installation and may be required in the installation of metallic pipelines where electric conductance is necessary and is not provided through the pipeline because of its type of construction. Tracer wire placement shall be as shown on the Plans but shall generally be immediately beneath (preferred), to the side, or above the pipeline with approximately 4 inches of separation. Tracer wire shall be brought to the surface of the ground at all valves and risers and where otherwise shown on the plans.

Tracer wire shall be installed as shown in the Plan details. Where splices in the wire are required, the Contractor shall solder the wire connections. Tee splices shall be made with a minimum of 4 turns wrapped tightly around the bared portion of the main tracer. Do not cut main tracer wire. Line splices shall be made by crossing the two bare sections of wire with a minimum of 4 turns in opposite directions as shown in splice detail. Solder and finish connection using a no. 1 welding tip with a soft non-carbonizing flame or a propane torch, using rosin flux and 60/40 rosin core solder. Do not use acid core solder under any circumstances. Use only enough heat to insure a smooth solder joint.

Heat should be applied to the wire, not to the solder. Heat the connection for a few seconds and touch the end of the solder to the joint; when the proper temperature is achieved, the solder will melt and flow freely around the connection. Allow the wire to cool and do not move while cooling. Insulate by applying several turns of 3 m 88 or approved equal electrical tape around the soldered joint. Extend the tape well over the wire insulation in all directions.

Some soil conditions and/or installation circumstances may require the additional installation of cathodic protection for the tracer wire. When this is the case, cathodic protection will appear as a separate bid item and details for its installation will appear on the Plans and elsewhere in these Specifications.

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02222.3.8.2 **WARNING TAPE** – A continuous ribbon of warning tape shall be installed during the backfill operation. Tape shall be placed 12-inches above the top of the pipeline. At roll ends and at places where the tape has been broken, the loose ends shall be tied together to prevent separation during the rest of backfill.

02222.3.8.3 **MARKING POSTS** – Marking posts shall be installed at the placement intervals shown on the Plans. Posts shall not be deformed or damaged during installation. The Contractor shall use a post hole digger to install markers when there is danger of damage to posts from pounding or hammering

02222.3.9 **CLEANUP**

Following acceptance of testing and completion of backfilling and surface restoration, the Contractor shall prepare the work for contract closeout in accordance with Section 01200 of these Specifications.

02222.4 **METHOD OF MEASUREMENT**

02222.4.1 **BURIED WATER LINES**

The amount of buried water line pipe shall be determined by measuring the lineal feet of pipe in place and accepted, including the lengths of fittings, valves, couplings, and portions of pipe within casings, unless called out otherwise in the Contract Documents.

Measurement of lines passing through, or connecting to control valves or other operating devices enclosed in vaults or manholes, shall be made only up to the pay limit of the enclosure or vault as shown on the Drawings. If no pay limit is shown, measurement will be made to a point five (5) feet outside of the enclosure.

Measurement of ductile iron pipe shall include polyethylene encasement where that material is required.

02222.4.2 **PIPELINE LOCATION IDENTIFIERS**

Measurement of tracer wire and location markers installed with non-metallic pipe shall be included in the measurement of the waterline pipe unless they are separate bid items in which case measurement for tracer wire shall be the same as the length of waterline installed and location markers shall be measured by counting the number of markers installed.

02222.4.3 **EXPOSED PIPELINES**

All information shall be provided in accordance with Section 01300 and written evidence of compliance shall be provided with each delivery of material.

02224.2 MATERIALS

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02224.2.1 PIPE

See Section 15110 for pipe materials specifications.

02224.2.2 MANHOLES AND ENCLOSURES

02224.2.2.1 MANHOLES - Manholes consist of the base, riser, cone and grade ring or rings. Manholes shall be constructed of pre-cast, reinforced concrete and shall conform to the Drawings, to Section 03500 of these Specifications, and to ASTM Standard C478. Unless shown otherwise on the Drawings, the wall thickness of 48-inch and 60 inch manholes shall be minimum 5-inches and 6-inches respectively. Cone sections shall be eccentric and be designed to meet AASHTO HS-20 loading requirements. Pipe connections and/or knockouts shall be sized and located according to the Drawings. Grade rings shall have 4-inches minimum vertical thickness.

02224.2.2.2 JOINTS - All manhole components shall be joined with tongue and groove joints and joints shall be sealed so that they are watertight. Sealant materials shall be flexible butyl resin sealant which conforms to AASHTO M-198B, or a rubber gasket may be used if it is specifically designed for installation in concrete manholes and conforms to ASTM C-361.

02224.2.2.3 RINGS AND COVERS - Manhole rings and covers shall be cast iron, be H-20 loading rated, be manufactured to fit the concrete openings of the manhole and shall meet the requirements of ASTM A48, Class 30B. The clear opening of the ring shall be 24-inches minimum. Vented covers, without dustpans, shall be provided for all manholes located where drainage or flooding will not occur. Watertight covers shall be provided wherever the manhole may be flooded with street runoff or floodwater. Combined weight of the ring and cover shall be not less than 360-pounds. All covers shall have cast into the upper surface the word "SEWER" and other lettering and insignias as may be shown on the plans.

02224.2.2.4 STEPS - Plastic or fiberglass steps reinforced with steel, which conform to ASTM C487 or ASTM C478 standards, shall be installed in all sections of each manhole as shown on the Drawings.

02224.2.2.5 CONNECTIONS - All connections to the manhole with piping shall be made with flexible positive seal, watertight gaskets or boots manufactured by Forsheda NPC, Inc., or an approved equal which meets the requirements of ASTM C923.

02224.2.3 PIPELINE LOCATION IDENTIFIERS

Pipeline location identifiers generally take the form of marker posts, warning tape, and tracer wire. The Contractor shall furnish and install such identifiers as shown on the Drawings and prescribed in these Specifications.

02224.3 CONSTRUCTION REQUIREMENTS

02224.3.1 HANDLING AND APPROVAL OR REJECTION OF MATERIALS

Care shall be taken during unloading and hauling to avoid impact which might damage the pipe. Pipe dropped during unloading shall not be installed unless approved by the Engineer and may be rejected by the Engineer. Pipe will be carefully inspected in the field before and after laying. If any cause for rejection is discovered in a pipe after it has been laid, it shall be removed and replaced by the

Contractor at no additional cost to the Owner. Any pipe which is found to be unfit or is rejected due to cracks, broken bells or spigots, chipped exterior or lining, etc., shall be removed from the job site.

02224.3.2 TRENCHING

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Excavation and backfill of trenches for sewer piping and manholes shall be performed in accordance with Section 02200 - "Trench Excavation and Backfill" of these Specifications.

02224.3.3 PIPE INSTALLATION

02224.3.3.1

DEWATERING - Prior to pipe laying and jointing, when water is present in the trench, sufficient dewatering effort shall be made to maintain the water level at or below the surface of the trench bottom or the base of the bedding course. The de-watering operation; however accomplished, shall be carried out in such a manner as not to permanently disturb natural groundwater conditions.

02224.3.3.2

CONNECTION TO EXISTING WORK - When connections are to be made to any existing pipe, conduit, or other appurtenance for which the actual elevation or position cannot be determined without excavation, the Contractor shall excavate for, and expose the existing pipe conduit, etc., before laying any new pipe or conduit. The Contractor shall furnish and install the necessary couplings, fittings, etc., needed to accomplish the cutting in, or connections, whether or not specifically indicated on the Drawings.

The Engineer shall be allowed to inspect the existing pipe or conduit before any connection is made. The Engineer may then make adjustments as required in the line and grade to accomplish the intent shown on the Drawings.

02224.3.3.3

PIPE JOINING - Pipe joining shall be as follows:

- When making connections, pipe shall be cut in a neat and workmanlike manner and beveled so as to provide a smooth end at right angles to the axis of the pipe. Pipe and fittings shall be assembled so there will be no distortion or springing of the pipelines. Care must be taken to properly align the pipe before joints are forced home. During insertion of the spigot end, the pipe shall be partially supported by hand, sling or crane to minimize unequal lateral pressure on the gasket and to maintain concentricity until the gasket is properly positioned. Since the most flexible gasketed joints tend to creep apart when the end pipe is deflected and straightened, such movement shall be held to a minimum once the joint is home.
- Where fusion of polyethylene pipe joints is required, sections of pipe shall be joined in a continuous length on the job site above ground. Joining shall be by the butt fusion method and shall be performed in strict accordance with the pipe manufacturer's recommendations. Equipment used for butt fusion joining shall be capable of meeting all conditions recommended by the pipe manufacturer, including, but not limited to, temperature requirements, alignment, and fusion pressures.
- PVC pipe, 2 inches and smaller in diameter, shall be joined by solvent welding. No disturbance of joints, including from trench backfill operations, will be allowed until solvent welded joints are cured.
- PVC pipe, larger than 2 inches in diameter, shall be joined by means of gasketed joints.
- With bell and spigot joints, care should be taken to properly align the pipe before joints are forced home. Gaskets shall be lubricated in accordance with manufacturer's instructions. During insertion of the spigot end, the pipe shall be partially supported by hand, sling, or crane to minimize unequal lateral pressure on the gasket and to maintain concentricity until the gasket is properly positioned. Since the most flexible gasketed joints tend to creep apart when the end

02224.3.5.3 JOINTS AND CONNECTIONS - All joints between manhole components shall be made watertight with a permanently flexible sealant. Connections to manholes with new piping shall be made with a rubber boot or seal which will assure a flexible, watertight seal and which conforms to ASTM C923. The connector shall be of a size specifically designed for the pipe material and hole size placed in the wall of the manhole.

02224.3.5.4 DROP MANHOLES - Drop sewer manholes shall be constructed in accordance with the details shown on the drawings, whenever a grade difference of more than 18-inches occurs in that manhole. For grade differences of less than 18-inches, the bottom of the trench shall be sloped to provide a smooth transition between incoming and outgoing sewer lines.

02224.3.6 FLUSHING AND CLEANING

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Prior to proceeding with testing, all sewer lines, manholes, and structures and connected piping installed under this Contract shall be flushed and cleaned. The Contractor shall provide all labor, materials, cleaning equipment, and water required to clean the system components.

Before isolating a specific section of line for flushing, the Contractor shall be responsible for making the necessary arrangements and appropriate piping connections to safely discharge the water used for flushing, to avoid any property damage or contamination of bodies of natural surface or ground water. The Contractor shall fill each section to be tested with clean potable water and then flush the line. The Contractor shall make the necessary arrangements so that a 2.5-foot per second flow velocity will be established in the lines during flushing. Flows required to produce the required flushing velocity indicated above are provided as follows:

FLUSHING FLOW AND VELOCITY

Pipe Diameter (inches)	Flow (gpm) to Produce 2.5 fps
4	100
6	200
8	400
10	600
12	900
16	1600

NOTE: With 40 psi residual pressure, 2 1/2 inch and 4-1/2 inch hydrant outlet nozzles will have the ability to discharge approximately 1,000 GPM and 2,500 GPM respectively.

02224.3.7 TESTING

02224.3.7.1 BACKFILL AND COMPACTION - No testing of any sewer line shall be performed until the trench has been backfilled and compacted to the appropriate unsurfaced grade or level.

02224.3.7.2 FORCE MAINS - Force mains shall be hydrostatically tested according to the requirements of AWWA - 600, Section 4, Hydrostatic Testing of Pipelines for Force Mains.

The Contractor shall furnish all necessary personnel, water, equipment, supplies, and plugging devices required to perform leakage tests as described therein. Any leaks or other deficiencies that are detected shall be repaired and the test section of pipe shall then be re-tested by the Contractor. This process shall be repeated until compliance is achieved.

02224.3.7.3 GRAVITY MAINS - All gravity main sewer piping shall be air pressure tested for exfiltration. Air pressure testing shall be accomplished in accordance with recommended practice (UNI-B-6) of the

Uni-Bell PVC Pipe Association for all pipelines less than 36-inches in diameter. Pressure testing will be made at all joints for lines 36-inches or greater in diameter. Testing will be performed with equipment equivalent to that manufactured by Cherne Industrial, Inc. and consistent with the procedure described as follows:

- All wyes, tees, and/or ends of lateral stubs shall be suitably capped and braced to withstand the internal test pressure of the section being tested. Caps shall be easily removable for making future lateral or extension connections.
- Test sections of sewer line shall be isolated by plugging at each manhole with pneumatic plugs. One of the plugs shall be fitted with connections to allow the following:
 - ⇒ Inflation of the pneumatic plug.
 - ⇒ Pressure measurement inside the isolated section of sewer line.
 - ⇒ Introduction of air under pressure into the isolated section of sewer line.
- Air for pressurizing and gauges for measuring pressures shall be supplied through and incorporated into a control panel manufactured specifically for such testing. The control panel shall be fitted with a 3 1/2-inch (or larger), 0 to 30-psi gauge for reading the internal line pressure. Calibrations on the gauge for the 0 through 10-psi range shall be in tenths of pounds.
- Personnel will not be allowed in any involved manhole while pressure is being applied to a test section.
- Air shall be introduced into the test section until the pressure stabilizes at 3.5 psi. Then the time required for the pressure to drop to 3.0 psi shall be observed, recorded, and compared to the following table of acceptability standards:

ALLOWABLE TIME FOR A 0.5 psi TEST PRESSURE DROP IN PVC SEWER PIPE

Pipe Diam. (inches)	Minimum Time in Minutes and Seconds for Various Lengths of Pipe							
	100 ft	150 ft	200 ft	250 ft	300 ft	350 ft	400 ft	450 ft
6	2:52	2:52	2:52	2:52	2:55	3:27	3:59	4:27
8	3:47	3:47	3:47	3:47	3:48	4:26	5:04	5:42
10	4:43	4:43	4:43	4:57	5:56	6:55	7:54	8:54
12	5:40	5:40	5:42	7:08	8:33	9:58	11:24	12:50
18	8:30	9:37	9:37	16:01	19:14	22:26	25:38	28:51

If the level of any groundwater present is higher than the level of the test section, the test air pressure shall be increased until it is 4 psi greater than the average backpressure induced on the line by the ground water. At least two minutes shall be allowed for the interior air pressure to stabilize at that pressure. Pressure in the line then shall be observed until it has decreased to 3.5-psi above the groundwater backpressure. The foregoing described test for a 0.5-psi pressure drop can then be commenced.

- Exfiltration testing for all pipe and joints shall be considered acceptable when the time measured for pressure to decrease from 3.5 to 3.0 psi is equal to or greater than the time shown above in the table.

Infiltration testing also shall be conducted for all gravity main sewer lines when the groundwater level is above the top of the pipe section being tested. Tests shall be made by observing and measuring the amount of water infiltration. Testing shall be conducted from manhole to manhole.

The length of pipe to be tested shall not exceed 700 feet. The following steps shall be taken as the testing proceeds:

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- Measurement of ground water elevation shall be made at the upper and lower ends of the test section and recorded. The upper end of the test section shall then be plugged and the flow of water leaving the lower end will be measured, either by directing the flow into a container of known volume or by observation of flow over a weir.
- Acceptance of the test section for infiltration compliance will be given when the rate of flow out of the section is less than 200 gallons per inch of internal pipe diameter per mile per 24-hour day.

All manholes shall be checked for infiltration by observing their interior surfaces for signs of water infiltration.

02224.3.7.4

DEFLECTION TESTING - All flexible wall sewer piping shall be tested for deflection by passing a mandrel sized to pass through a 5-percent deflection (or deformation) of the pipe section being tested. The Engineer may waive this requirement on short footage projects. Requirements for making such tests are provided as follows:

- Deflection testing shall not be conducted until backfill in the trench has been in place for at least 30 days.
- The test shall be performed by moving the mandrel through the test section without the aid of a mechanical pulling device.
- The mandrel shall be fitted with an odd number of fins or legs (at least nine) which are not worn sufficiently to affect the mandrel's diameter. The fins shall be sized to fit the specific type and size of pipe being tested and shall be stamped by the manufacturer to identify the type and size of pipe. When requested, the Contractor shall provide proof rings to check the mandrel's diameter. The length of the contact edge of the fins shall be at least equal to the pipe's nominal diameter.
- Acceptance of the test section of pipe will be given when the mandrel can pass through that section without stoppage. If stoppage occurs, the pipe shall be excavated and exposed for examination to determine if damage to the pipe has taken place. When pipe damage has occurred, the damaged section shall be removed and replaced by the Contractor. If an obstruction has been caused by deflection, but the pipe is undamaged, the Contractor shall replace the bedding as necessary and carefully re-compact the bedding and backfill. When such corrective measures are completed, the mandrel shall be passed through the test section again to assure compliance.

02224.3.7.5

TESTING DOCUMENTATION - The Contractor shall maintain a record of the procedures performed and the test results for all tests performed on pipelines installed under this Contract. Information contained on the record shall include the following:

- Identification of Contract.
- Contractor's name and name of testing entity, if performed by other than Contractor.
- Name of Test Supervisor.
- Date of test.
- Type of test (air pressure, infiltration, deflection, etc.).
- Identification of test section which includes location, size, and type of pipe.
- Test results (pass/fail, amount of leakage, etc.).
- Description of failure, if any, including reason for failure and corrective measures taken.
- Signature of Test Supervisor.
- Approval signature of Engineer or Engineer's Representative witnessing the tests.

Photocopies of the test documentation shall be provided to the Engineer within 48 hours after the tests are performed and acceptance of the test section is achieved.

02224.3.8 PIPELINE LOCATION IDENTIFIERS

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The Contractor shall furnish and install all pipeline location identifiers as called for on the Plans.

02224.3.9 CLEANUP

Following acceptance of testing and completion of backfilling and surface restoration, the Contractor shall prepare the work for contract closeout in accordance with Section 01200 of these Specifications.

02224.4 METHOD OF MEASUREMENT

02224.4.1 PIPE AND APPURTENANCES

This measurement shall be made using a tape measure or other accurate measuring device to determine the total number of lineal feet of pipe in place and accepted. Measurement of pipe shall be made from inside of manhole connection to inside of manhole connection, or to the outside of other structures, and shall include the lineal measurement of valves, fittings, pipe within casings, etc., that occur in the line. This measurement also shall include all work items necessary to completion of the sewer system such as trench excavation, backfilling, compaction, and testing, as well as "furnish and install" or "install only" items such as pipe and fittings, location markers, tracer wire, and warning tape as required on the Drawings.

02224.4.2 MANHOLES

Measurement of manholes shall be made by counting the number of manholes of each of the sizes (diameters) indicated on the Drawings, with drop piping, that have been installed and accepted. Variations in the vertical depth of manholes will not be taken into consideration.

Measurement of drop manholes shall be made in the same manner and shall include the drop piping and appurtenances required for making the drop.

As with pipe, measurement for all manholes shall include all work and materials necessary for the finished, functional, and accepted construction of the manhole.

02224.4.3 CONNECTIONS TO EXISTING WORK

Measurement for connections to existing pipe, manholes, or other structures shall be made by counting the number of each type or size of connection made and accepted, as indicated on the Drawings.

02224.4.4 SERVICE TAPS

Measurement for service taps shall be made by counting each connection made to a sewer main. Such measurement shall include furnishing and installing the connection fitting, including all labor and materials required to cut and install the fitting to the main, and for the marker placed on the upstream end of the service lateral.

02224.4.5 SERVICE STUBS

A tape measure or other accurate measuring device shall be used to determine the number of lineal feet of service stub in place and accepted, measuring from the fitting on the main sewer line (service tap) to the termination point of the service stub at the property line.

02224.4.6 SERVICE LATERALS

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A tape measure or other accurate measuring device shall be used to determine the number of lineal feet of service lateral, measuring from the end of the service stub at the property line to the termination point of the lateral as constructed in the field.

02224.5 BASIS OF PAYMENT

02224.5.1 The accepted quantities will be paid for at the contract unit price for:

PAY ITEM	UNIT
(Size)(Type) Sewer Pipe	Lineal Foot
(Size) Manhole	Each
(Size) Drop Manhole	Each
(Size) Connection to Existing (Structure)	Each
Service Tap	Each Lineal
(Size)(Type) Service Stub	Foot Lineal Foot
(Size)(Type) Service Lateral	

02226.1 DESCRIPTION

Includes furnishing all labor, equipment and materials required to install pipe, dispose of unsuitable materials, perform trench backfilling and compaction in conformance with Section 02200 and provide pavement restorations in conformance with Section 02500.

02226.1.1 RELATED WORK

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Section 02105 - Earthwork Materials

Section 02200 - Trench Excavation and Backfill

Section 02500 - Removal and Replacement of Surface Improvements

02226.1.2 SUBMITTALS

Submit manufacturer's certification that all material furnished is in compliance with specifications, standard references, and contract requirements in accordance with Section 01300.

02226.1.3 DEFINITIONS

Pipe Zone - The area around the pipe in the trench width and up to 12-inches over the pipe.

Drainage Pipe - Perforated and non-perforated pipe used for collection and transmission of subsurface drainage.

Culvert - Pipe used for transmission of surface water under and around roadways.

02226.2 MATERIALS

The Contractor shall not change pipe size, material or class without written approval from the Engineer. Provide the type, class and size of pipe shown on the Drawings and conforming to the following:

02226.2.1 REINFORCED CONCRETE PIPE

Use Class A or B with Type II cement, which conforms to AASHTO M-170. Elliptical pipe shall be Class A or B, which conforms to AASHTO M-207 with tongue and grove joints.

02226.2.2 CORRUGATED POLYETHYLENE CULVERT PIPE

Corrugated polyethylene culvert pipe shall be Class A or B conforming to the requirements of AASHTO M-294.

02226.2.3 CORRUGATED GALVANIZED STEEL PIPE AND PIPE-ARCH

Corrugated galvanized steel pipe and pipe-arch shall be Class A, B or C, which conforms to the requirements of AASHTO M-36.

02226.2.4 CORRUGATED ALUMINUM PIPE AND PIPE-ARCH

Corrugated aluminum pipe and pipe-arch shall be Class A, B or C, which conforms to the requirements of AASHTO M-196 and M-197.

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02226.2.5 PVC DRAIN PIPE

Solid wall and perforated drain pipe with rubber gasketed joints, which conforms to the requirements of ASTM D2729. Perforation shall follow the ASTM D2729 perforation pattern of 2, one-half inch holes 120° apart with 5-inch spacing.

02226.2.6 PE DRAIN PIPE

Corrugated solid wall and perforated drainpipe with rubber gasketed joints, which shall conform to ASTM F405.

02226.2.7 DRAIN GRAVEL

Drain Gravel shall comply with the requirements provided in Section 02105.

02226.2.8 GEOTEXTILE FABRIC

Geotextile Fabric shall be as called for on the Drawings and specified in Section 02950.

02226.3 CONSTRUCTION REQUIREMENTS

02226.3.1 HANDLING AND STORAGE OF PIPE

The Contractor shall handle and store pipe to prevent damage by crushing or piercing and in such a way as to prevent contamination. Any pipe delivered to the Work site, which does not conform to specifications or is scratched, bent, cracked, chipped or otherwise damaged, shall be rejected. The Contractor shall protect pipe and components against dirt and damage during shipment and storage and shall store pipe in strict conformance with the manufacturer's recommendations. The Contractor shall not store PE or PVC plastic pipe in direct sunlight for more than 30 days.

02226.3.2 PREPARATION

The Contractor shall verify location of existing utilities and structures ahead of pipe laying operation. If pipe adjustment is necessary due to location of other utilities, secure approval from Engineer prior to proceeding.

02226.3.3 TRENCHWORK

The Contractor shall excavate trenches in accordance with Section 02200. The Contractor shall repair unstable subgrade for pipe installation by over-excavating to stable soils or a minimum 8-inches depth and replace with approved stabilization material.

02226.3.4 DEWATERING

The Contractor shall keep the pipe trenches free from water during pipe installation by a method acceptable to the Engineer.

The Contractor shall be responsible for damages of any nature resulting from the dewatering operations, notwithstanding approval of the method by the Engineer.

02226.3.5 SHORING

The Contractor shall provide trench shoring and protection in accordance with applicable OSHA standards and Section 01510.

02226.3.6 INSTALLATION

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02226.3.6.1 PLACEMENT - Pipe placement shall be as follows:

- The Contractor shall handle and install pipe as per manufacturer's specific instructions.
- The Contractor shall make bellholes and depressions only of such length, depth and width as required for properly accommodating the particular type of pipe joint being installed.
- The Contractor shall join pipe in accordance with manufacturer's recommendation or as specified in piping specification section.
- Pipelines shall be laid on uniform grades.
- Do not install pipe at a grade less than 0.5%.
- Lay gravity flow pipe upgrade beginning at lower end.
- Pipe shall not be installed without continuous support under the barrel.
- The Contractor shall obtain written approval from the Engineer to deflect pipe from true line and grade. Do not exceed deflection allowed by pipe manufacturer's recommendation.
- The Contractor shall not lay pipe in water or when trench conditions or weather are unsuitable for such work.
- The Contractor shall place circular concrete pipe which contains elliptical reinforcing so that the reference lines designating the top of the pipes will not be more than 5° from the vertical plane through the longitudinal axis of the pipe.
- Not more than 300 feet of continuous pipe placement will be allowed without the installation of an inlet box, catch basin, combination box, clean-out box, manhole or other such structure.

02226.3.6.2 CUTTING TOOL - The Contractor shall use an approved machine or cutting tool recommended by the pipe manufacturer to cut pipe.

02226.3.6.3 DAMAGED PIPE - The Contractor shall remove and relay any section of pipe already placed which is found to be out of alignment, defective or damaged.

02226.3.6.4 PLUGS - The Contractor shall provide plugs for pipeline branches, stubs or other open ends, which are not to be immediately connected. The Contractor shall use a joint comparable to the main line joints and thrust block as required to secure plugs.

02226.3.6.5 GALVANIZED PIPE - The Contractor shall provide protection to galvanized pipe to prevent scratches or abrasion and assure that the coating is not damaged. Remove and replace damaged pipe sections when directed by the Engineer. Provide proper facilities for lowering sections of pipe into trenches.

- 02226.3.6.6 CONNECTION TO CONCRETE - The Contractor shall form, size and finish structures connecting piping in accordance with the details of the Drawings and Section 03100. The Contractor shall install mortar in joints at catch basins, clean-outs, manholes, etc. Remove all loose material and soil from the surface on which concrete will be placed. Non-metallic pipe shall be thoroughly wetted prior to pouring the collars.
- 02226.3.6.7 PIPE BEDDING - Unless otherwise shown on these Contract Documents, culverts shall be bedded with on site bedding materials or imported bedding, which conforms to Section 02105. Drainage piping shall be bedded in accordance with the details shown on the Drawings with material which also conforms to Section 02105.
- 02226.3.6.8 BACKFILL - The Contractor shall compact trench backfill in accordance with the requirements of Section 02200 and 02222.
- 02226.3.7 INSPECTION ENT 102458:2000 PG 258 of 480

Prior to starting backfill of trenches, the Contractor shall notify the Engineer of completion of pipe laying and allow the Engineer to check all installed drain piping and culverts. When access to installed pipe is determined necessary for checking by the Engineer, the Contractor shall open any covering as requested. If defects are found, the Contractor shall make the necessary corrections at no cost to the Owner. If no defects are found, the cost of uncovering and recovering shall be an additional expense covered by the Owner in accordance with the General Conditions (Section 00700).

02226.4 METHOD OF MEASUREMENT

02226.4.1 PIPE AND CULVERTS

Measurement of drainage piping and culverts shall be made by using a tape measure or other accurate measuring device to determine the number of lineal feet of pipe or culvert, along the centerline of the pipe, installed and accepted. This measurement shall include the lengths of all in-line fittings and shall stand as the measurement of all other work involved with the pipe installation such as trenching, backfilling, and site restoration as required.

02226.4.2 ENTRANCE AND EXIT STRUCTURES

Measurement of culvert or drainage pipe entrance and exit structures and measurement of culvert end sections shall be separate from the lineal measurement of the pipe and shall be made by counting the number of such structures built and accepted.

02226.4.3 OTHER WORK AND MATERIALS

The method of measurement for other work and materials such as drain rock, geotextile fabric, and import bedding and backfill will be described separately when called for on the Drawings, in these Specifications, or required by the Engineer.

02226.4.4 DEWATERING

Dewatering of trenches is considered incidental to the construction. The Contractor shall include all associated costs for trench dewatering in the lump sum contract price.

02226.5

BASIS OF PAYMENT

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The accepted quantities will be paid for at the contract unit price for:

PAY ITEM	UNIT
(Diameter, Type) Culvert Pipe	Lineal Foot
(Diameter, Type) Drain Pipe	Lineal Foot
Entrance/Exit Structures	Each
Culvert End Section	Each

Payment for other materials, (i.e., drain rock, imported bedding and backfill, geotextile fabrics, etc.) will be made in accordance with their respective specification requirement.

02500.1 DESCRIPTION

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This work includes removal and restoration of existing features, public or private, including but not limited to asphalt or concrete pavement, concrete structures, curb and gutter, sidewalk, gravel surfacing, driveways, crosswalks, landscaping, field crops, irrigation ditches, fences, culverts, buried or exposed utilities, abandoned utilities, small utility buildings and the disposal of resulting waste materials and debris.

02500.1.1 RELATED WORK

Section 01510 - Protection of Existing Properties
Section 02015 - Clearing and Grubbing
Section 02200 - Trench Excavation and Backfill
Section 02511 - Hot Plant Mix Bituminous Surfacing
Section 02512 - Road Mix Bituminous Surfacing
Section 02520 - Pavement Cutting
Section 02900 - Landscaping

02500.1.2 SUBMITTALS

When any improvement not owned by the Owner is designated for restoration work, then, upon completion of such restoration, the Contractor shall obtain a written statement of acceptance or release from the responsible owner of the feature. This statement, in turn, will be submitted to the Engineer for his review and approval prior to acceptance of the work for payment.

02500.1.3 DEFINITIONS

Not used.

02500.2 MATERIALS

02500.2.1 GENERAL

When restoration of a feature is indicated in the Contract Documents, such work shall be accomplished so as to restore the feature to its original, or better, condition and/or function as it existed prior to removal.

It is recognized that exact duplication of materials cannot always be achieved, but reasonable effort is expected from the Contractor to restore the feature with materials which will provide the same or better service and appearance as observed prior to removal.

All materials shall be new.

02500.2.2 BITUMINOUS SURFACE

02500.2.2.1 PRIMER OR TACKER COAT - Shall be an approved bituminous material such as type MC-70-250, SS1, or CS-1.

02500.2.2.2 PATCHING AND REPAIR - Plant mix material that meets or exceeds the requirements of Section 02511 herein, or of the local State Department of Transportation for asphalt surface road repair, shall be used for patching and repair.

- 02500.2.2.3 SURFACING - Shall be hot or cold mix bituminous surfacing, meeting or exceeding the requirements of Sections 02511 or 02512 herein, or of the local State Department of Transportation for asphalt surface road repair.
- 02500.3 CONSTRUCTION REQUIREMENTS ENT 102458:2000 PG 261 of 480
- 02500.3.1 UNCLASSIFIED REMOVAL AND RESTORATION
- 02500.3.1.1 EXISTING IMPROVEMENTS - All existing facilities disturbed by the Contractor in prosecution of the Work, including but not limited to asphalt or concrete pavement, concrete structures, curb and gutter, sidewalk, gravel surfacing, driveways, crosswalks, landscaping, field crops, irrigation ditches, fences, culverts, buried or exposed utilities, abandoned utilities, small utility buildings or any other structures or obstructions designated to be removed on the Drawings, by the Engineer, or these Specifications, shall be removed, cleaned up, and then restored or replaced in kind by the Contractor in new condition.
- 02500.3.1.2 ADJACENT IMPROVEMENTS - Care shall be exercised in such removal to assure that adjacent facilities or structures, which are to remain, are not disturbed. Any damage to such existing facilities or structures resulting from carelessness or negligence on the Contractor's part shall be satisfactorily restored to new condition at the Contractor's expense.
- 02500.3.1.3 VEGETATION.- Trees, shrubs, and other landscape plants designated to be saved for replanting shall be carefully removed, bundled, set aside and protected for replanting by the Contractor. Turf Sod to be saved for replanting shall be removed by machine cutting. In lieu of removal and replacement of turf sod or field crops, the Contractor may, upon approval of the property owner, remove and replant the same. Such agreements shall be documented on the final property release to be signed by the property owner.
- Replanting of landscape items shall be performed in accordance with Section 2900.
- 02500.3.2 TOPSOIL
- 02500.3.2.1 REMOVAL AND PROTECTION - In all construction areas where re-growth of vegetation is desired, and when called for by the Contract Documents, the Contractor shall remove, segregate, stockpile, store, and protect topsoil during excavation in accordance with Section 02900. Topsoil shall be kept free from contamination from foreign materials and other soils. The Contractor shall arrange construction activities to avoid damage or disturbance to the stockpiled soil.
- 02500.3.2.2 REPLACEMENT - When backfill operations have been completed, the topsoil shall be replaced and restored to the original contours or as called for on the Drawings, in accordance with Section 2900 of these Specifications.
- 02500.3.3 GRAVEL SURFACE
- 02500.3.3.1 REMOVAL - When restoration of graveled driveways, roadways, or parking areas is required, the existing gravel surfacing shall be graded off and stockpiled safely away from ongoing work activities, to prevent contamination with subsurface materials. It may then be reapplied and compacted during restoration activities.
- 02500.3.3.2 RESTORATION - Areas to be restored shall be backfilled and graded to uniform lines and compacted to the density prescribed for trenching in Section 02200. Existing gravel surfacing materials shall then be replaced in uniform 3 inch layers compacted to 95% of maximum density. After compaction, the affected area shall be graded smooth. Sufficient new material of equal or

better quality shall be applied and mixed in, to replace materials lost during prosecution of the Work, to ensure a 3-inch minimum gravel cover after compaction and grading.

02500.3.4 BITUMINOUS SURFACE ENT 102458:2000 PG 262 of 400

02500.3.4.1 REMOVAL - Bituminous pavement surface shall be removed and restored in accordance with this paragraph unless provisions for restoration are made in other Sections of these Specifications. The pavement surface, public or private, designated for removal shall be removed to neat lines, which shall be cut in accordance with Section 02520. No ripping or rooting will be permitted outside of the limits of the cut lines.

Existing driveways, sidewalks, etc., which do not match the new finish grade as shown on the Drawings, also shall be removed preparatory to restoration work.

02500.3.4.2 DISPOSAL - Surfacing materials removed shall be disposed of in accordance with Section 1520 of these Specifications, and will not be permitted in the backfill, except as specifically authorized by the Engineer and in accordance with local requirements.

02500.3.4.3 RESTORATION - Restoration of bituminous surface shall proceed according to the following steps:

- First, the sub-grade shall be graded to a uniform surface, and 6 inches of Untreated Base Coarse (UBC) gravel shall be placed over the area in lifts not thicker than 3 inches, compacted to 95% of its maximum density.
- Then, the exposed edges of existing pavement shall be primed with a material approved for this purpose.
- Unless shown otherwise on the drawings or required otherwise by the Engineer, hot or cold mix bituminous surfacing shall be spread and compacted in individual, 3-inch maximum lifts over the base course. Minimum thickness of the new bituminous surfacing layer shall be equal to the adjacent surface thickness, but shall be not less than 3 inches thick when compacted to 95% of its maximum density.
- Rolling operations shall be conducted in such a manner that shoving or distortion will not develop beneath the roller. The surface shall be finished to a smooth, uniform line and grade with surface deviations not exceeding plus or minus 1/4 inch in 10 feet, unless the surface is subject to more stringent State, County, or Municipal requirements. The determination of smoothness compliance may be made with a straight edge or string line at the option of the Engineer. Any irregularities shall be satisfactorily corrected at the sole expense of the Contractor.
- Existing driveways, sidewalks, etc., which were removed because they did not match the new finish grade, shall be replaced and restored to their original or better condition to match the new finish grade shown on the Drawings, or as directed by the Engineer.

02500.3.5 REMOVAL AND RESTORATION OF CONCRETE IMPROVEMENTS.

02500.3.5.1 REMOVAL - Existing concrete pavement in streets, alleys, driveways, sidewalks, etc., public or private, shall be cut in accordance with Section 02520, and removed to the lines indicated on the Drawings, or as directed by the Engineer. No ripping or rooting will be permitted outside of the limits of saw cut lines.

Existing driveways, sidewalks, etc., which do not match the new finish grade as shown on the Drawings, also shall be removed preparatory to restoration work.

02500.3.5.3 DISPOSAL - All materials removed shall be disposed of in accordance with Section 1520 of these Specifications, and will not be permitted in the backfill, except as specifically authorized by the Engineer and in accordance with local codes.

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02500.3.5.4 RESTORATION - Sub surface preparations shall be the same as those in paragraph 02500.3.4.3 above.

- Concrete pavement including sidewalks, driveways, roadways, and parking area surfacing shall be replaced by the Contractor in accordance with Division 3 of these Specifications, unless otherwise directed by the Engineer
- Those existing driveways, sidewalks, etc., which were removed because they did not match the new finish grade, shall be replaced and restored to their original or better condition to match the new finish grade shown on the Drawings, or as directed by the Engineer.
- All other concrete improvements shall be restored in accordance with details shown on the Drawings, or as directed by the Engineer, and as required by the provisions of Division 3 of these Specifications.

02500.3.6 REMOVAL AND RESTORATION OF FENCES

When necessary to remove any fence to facilitate its operation, the Contractor shall obtain prior agreement with the owner of the fence for its removal. Temporary containment measures shall be provided, if needed, at no additional expense to the Owner. As soon as practical, the permanent fence shall be restored to its original condition or better.

02500.3.7 RESTORATION OF IRRIGATION DITCHES

Restoration of irrigation ditches shall be made in such a manner that the ditch configuration and size will be equivalent to its original condition and the ditch will be located on its original alignment. Any embankment required to restore the original slope of the ditch will be layer compacted with mechanical compaction equipment to 90% of maximum dry density determined by AASHTO T-99.

02500.3.8 CLEANUP

Areas of construction activity shall be left in a condition of uniform grade, blending into pre-existing contours and concealing, as much as possible, evidence of construction activity by back dragging or raking to conceal tire marks. Cleanup and disposal of surplus materials shall be performed in accordance with Section 1520.

02500.4 METHOD OF MEASUREMENT

02500.4.1 NO BID SCHEDULE LINE ITEM

When the Bid Schedule in the Contract does not contain a line item for "Removal and/or Restoration of Surface Improvements", then this work will be considered incidental to other items included in the Bid Schedule, and no separate measurement shall be made for this work.

02500.4.2 "DESIGNATED AREA" LINE ITEM

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Measurement for removal and/or of surface improvements in a designated area shall be the "lump sum" of the work required to remove and properly dispose of materials resulting from removal.

02500.4.3 "DESIGNATED FEATURE" LINE ITEM

Measurement for removal and/or restoration of designated features shall be per unit as described in the Bid Schedule.

02500.4.4 BITUMINOUS SURFACE PAY LIMIT

Measurement for bituminous surface removal and replacement shall be made by multiplying the pay limit by the actual length of removal and replacement in lineal feet as determined using a tape measure or other accurate measuring device.

In general, for pipe trench excavation, the pay limit shall be determined by the formula $W = OD + 18$ inches (pay limit width equals pipe outside diameter plus 18 inches), rounded up to the nearest standard bucket width. Actual measurement may be modified according to information indicated on the Drawings or as directed by the Engineer.

The pay limit for removal of bituminous surface for other purposes shall be as shown on the Drawings or directed by the Engineer.

02500.4.5 DAMAGED ITEMS

Measurement of items damaged or removed as a result of the Contractor's negligence shall not be allowed and no payment will be made under this contract.

02500.5 BASIS OF PAYMENT

The accepted quantities will be paid for at the contract unit prices as follows:

PAY ITEM	UNIT
Removal of Site Surface Improvements	Lump Sum
Removal of <i>(Name of Structures)</i>	Each
Removal of Sidewalk	Square Yard
Removal of Fences	Lineal Foot
Removal of Driveway Slabs	Square Yard
Removal of Curb and Gutter	Lineal Foot
Replace <i>(Name of Structure)</i>	Each
Replace <i>(Thickness)</i> Sidewalks	Square Yard
Replace <i>(Thickness)</i> Driveway Slabs	Square Yard
Replace <i>(Description)</i> Fence	Lineal Foot
Replace <i>(Description)</i>	Lineal Foot or Lump sum
Restore <i>(Description)</i>	Lineal Foot or Lump Sum

- 02511.1 DESCRIPTION ENT 102458:2000 PG 265 of 480
- Includes manufacturing, transporting, laying and compacting hot mixtures of bituminous surfacing for roads, parking areas, sidewalks and other traffic surfaces.
- 02511.1.1 RELATED WORK
- Section 02500 – Removal and Replacement of Surface Improvements
Section 02512 - Road Mix Bituminous Pavement
Section 02513 - Asphalt Tack Coat
- 02511.1.2 SUBMITTALS
- 02511.1.2.1 MIX DESIGN - The Contractor shall develop and submit proposed mix-designs based on the Marshall Method for Hot Asphalt Paving Mixtures as established in AASHTO T 245. The submittal shall include a laboratory report incorporating all of the information required by that specification, together with curves developed from the mix designs showing varying percentages of asphalt by dry weight of mix versus unit weight, percent air voids, stability, flow and percent voids in mineral aggregate.
- 02511.1.2.2 JOB MIX FORMULA – At least 15 days prior to producing bituminous mixtures, the Contractor shall submit to the Engineer, in writing, a proposed job-mix formula for each mixture for use in setting the job-mix formula to be used with the proposed materials. For bituminous mixtures, the proposed job-mix formula shall be based on a mix-design-run on aggregates, crushed or otherwise, produced for the project and using the bituminous material that will be furnished for the project.
- Each job-mix formula shall propose definite single values (hereafter referred to as Target Values or TV) for:
- The percentage of aggregate passing each specified sieve based on the dry weight of aggregate. These percentages shall be within the range shown in Table 2-H.
 - The percentage of bituminous material to be added based on the total weight of mixture.
 - The temperature of the mixture as it leaves the mixer.
 - The temperature of the mixture placed on the road immediately preceding initial compaction of the mixture.
 - The kind and percentage of additives to be used (Hydrated lime may be added to prevent stripping).
 - The kind and percentage of mineral filler to be used.
 - The percentage of water, based on the total dry weight of mixture.
 - The maximum specific gravity of dense graded hot mix bituminous paving mixtures as determined by AASHTO T 209 (For open graded hot mixes, the laboratory density developed during mix design shall be used as the TV. It shall be the maximum density for the TV bituminous content).
 - The mixture shall have a minimum dry retained strength value of 200 psi.

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After reviewing the Contractor's proposed job-mix formula, the Engineer shall determine a job-mix formula with single values for the nine parameters listed above, and so notify the Contractor in writing.

Should a change in source of material be proposed, or should a job-mix formula prove unsatisfactory, the Contractor shall establish a new job-mix formula and shall submit same to the Engineer.

02511.1.2.3 PENETRATION/VISCOSITY/TEMPERATURE RELATIONSHIPS - The Contractor shall submit penetration/viscosity/temperature relationships for the bituminous material to be used in the Work along with a certification from the supplier attesting to their accuracy. If the supplier finds it desirable or necessary to change crudes or blends of crudes, new relationships must be supplied along with a sample to use in running a new mix-design. This submittal shall be made not less than 15 days prior to delivery of material from the changed source of materials. The penetration and viscosity values shall be determined at the temperatures and by the procedures specified in AASHTO M 226.

02511.1.3 DEFINITIONS

Plant - Stationary machinery used for manufacturing mixtures of asphalt cement, liquid asphalt with aggregate to form a uniform mixture of bituminous surfacing. Sometimes referred to as "batch plant".

Aggregate - Crushed stone, gravel or slog with uniform particle sizes.

Gradation - A group of particle size limits that are prescribed for aggregate.

Job-Mix Gradation - A gradation of aggregate which has been developed by a contractor or material supplier which can consistently be produced from a given source.

Job-Mix Formula - A mixture of asphalt materials and aggregate which can be consistently produced from a given source with the available plant of a contractor or material supplier.

Course - A single layer of bituminous surfacing.

Mat - Single or multiple layers of bituminous surfacing which have been placed.

Lot - The amount of bituminous mixture placed during a production day.

02511.2 MATERIALS

02511.2.1 ASPHALT CEMENT

Shall meet the requirements of AASHTO M 20 for penetration-graded asphalt cement and AASHTO M 226 for viscosity-graded asphalt cement. When not shown otherwise, the Contractor shall use viscosity grade AC-20 asphalt cement for the bituminous mixture.

02511.2.2 AGGREGATES

Aggregates for hot bituminous mixtures shall be crushed stone, slag or gravel meeting the quality and gradation requirements shown below in Tables 1-H and 2-H, unless shown otherwise in the Contract Documents.

When crushed gravel is used, at least 50 percent by weight of the particles retained on the Number 4 sieve shall have at least one mechanically fractured face.

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TABLE 1-H CRUSHED AGGREGATE QUALITY REQUIREMENTS FOR HOT BITUMINOUS PAVEMENT.

Description	AASHTO Test Method	Requirements
Percent Wear	T 96	40 max.
Durability Index, Coarse and Fine	T 210	35 min.
Sand Equivalent (Alternative Method Number 2)	T176	45 min
Stripping Test	T 182	Min. 95% coated**

** An approved chemical additive may be used to meet this requirement.

TABLE 2-H GRADATION LIMITS FOR CRUSHED AGGREGATE USED IN HOT BITUMINOUS SURFACING.

Sieve Size	Percent of Total Aggregate (dry weight)			
	1-inch (1)	¾-inch (2) (Non-rutting)	¾-inch (3)	½-inch (4)
1 inch	100			
¾ inch		100	100	
½ inch	75-91	74-99		100
3/8 inch		69-91	75-91	
No. 4	47-61	49-65	46-62	60-80
No. 8		33-47		
No. 16	23-33	21-35	22-34	28-42
No. 50	12-22	6-18	11-23	11-23
No. 200	5-9	2-6	5-9	5-9

When aggregate is produced and/or stockpiled in more than one size, the blend of sizes shall be based on results of mix design properties that yield the most ideal results. The blended gradations; however, must stay within the gradation limits given herein.

02511.3 CONSTRUCTION REQUIREMENTS

02511.3.1 BITUMINOUS SURFACE MIXING, PLACEMENT, AND FINISHING

02511.3.1.1 PLANT DESIGN AND EQUIPMENT - Plants shall be specifically designed and manufactured to produce a uniform bituminous mixture. The plant shall be capable of controlling and accurately proportioning both aggregates and asphalt cement. Automatic controls shall be provided to shut down the plant when a supply of aggregate or bituminous material is not available.

The plant shall be equipped with appropriate dust collectors and/or control equipment, which enable operation of the plant to meet local and State environmental and health requirements. Liquids from a wet scrubber, when used, shall not be discharged into live streams, lakes or ponds. Effluent from such equipment shall be collected and deposited according to applicable State and local requirements.

Thermometers shall be installed in the plant to accurately indicate the temperature of the bitumen at the charging value in the mixer unit and at the discharge chute of the mixer unit.

Accurate weight measurement of ingredients is essential. Bituminous mix plants shall have associated weight measurement equipment (scales, etc.) with an incremental accuracy of not more than 10 pounds to weigh materials.

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02511.3.1.2 MIXING - The aggregates, bituminous material, additives, mineral filler and water shall be measured or gauged and introduced into the mixer in the amount specified by the job mix formula. The bituminous material shall be evenly heated to the specified temperature. A continuous supply of the bituminous material shall be fed to the mixer at a uniform temperature. The temperatures of asphalt cement delivered to the mixer shall be sufficient to achieve a kinematic viscosity of 150 to 300 centistokes.

Aggregate for pugmill mixing shall be heated, dried, and delivered to the mixing unit at a temperature within $\pm 30^{\circ}\text{F}$ of the temperature of the bitumen, temperature not to exceed 325 degrees F. Moisture content of the aggregate shall not exceed 1 percent at the time it is introduced into the mixing unit. Flames used for drying and heating shall be properly adjusted to avoid damage to, and soot formation on, the aggregate.

After the required amounts of all materials have been introduced into the mixer, the ingredients shall be mixed until a complete and uniform coating of the particles and a thorough distribution of the bituminous material throughout the aggregate have been obtained.

02511.3.1.3 HAULING - Trucks used for hauling bituminous mixtures shall have tight, clean, smooth metal beds that have been thinly coated with a material to prevent the mixture from adhering to the beds. Truck beds shall not contain any water or deleterious material prior to loading.

The Contractor, at no cost to the Owner, shall provide scales for weighing the vehicles used for hauling the bituminous mixture. If of the required accuracy, these scales may be the same as those used to weigh ingredients at the mix plant. The Contractor shall provide such scales at no additional cost to the Owner.

02511.3.1.4 PLACEMENT - Except for small areas inaccessible to such equipment, hot bituminous mixtures shall be placed with bituminous pavers. Pavers shall be self-contained, power-propelled units, provided with an adjustable activated-screed or strike-off assembly, heated if necessary, and capable of spreading and finishing courses of bituminous plant mix material in lane widths and thickness' as shown on the Drawings. When shown on the Drawings, pavers shall be equipped with a control system capable of automatically maintaining the proper screed elevation.

Placement of the bituminous mixture shall be continuous. The mixture shall be spread and struck off to the grade and elevation established in the Contract Drawings. Unless otherwise shown on the Drawings, mix shall be placed in lifts which, when compacted, will not exceed 4-inches in thickness.

The longitudinal joint in one layer shall offset that in the layer immediately below by approximately 6-inches, making sure that the joint in the top layer shall be at the center or dividing line of every two-lanes of traveled roadway. Transverse joints in succeeding layers and in adjacent lanes shall be offset at least 10-feet.

On areas where irregularities or unavoidable obstacles make the use of mechanical spreading and finishing equipment impracticable (along forms, curbs, headers, walls and other places), the

mixture shall be placed and finished using hand tools and then thoroughly compacted with hot hand tampers, smoothing irons or mechanical tampers.

Bituminous surface shall not be placed when: weather conditions prevent proper handling, hauling and placing of the mixture; when the base course is frozen; or when the average temperature of the underlying surface is below 35 degrees F. and air temperature is rising. Placement on water covered surfaces will not be permitted.

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- 02511.3.1.5 COMPACTION - Compaction shall be performed with vibratory or non-vibratory steel-wheel rollers and pneumatic-tire rollers. Initial breakdown rolling shall be accomplished while the mix temperature exceeds 250° F. Rolling shall be completed before the mix temperature drops to 175° F.

Rollers shall begin at the sides and proceed longitudinally parallel to the road centerline, each trip overlapping 6-inches or two times the pavement depth, whichever is greater, gradually progressing to the center. When paving in echelons or abutting a previously placed lane, the longitudinal joint should be rolled first, then followed by the above rolling procedure. On super-elevated curves, the rolling shall begin at the low side and progress to the high side.

Rollers shall not pass over the unprotected end of a freshly laid mixture. Transverse joints shall be formed by cutting back into the previous run to expose the full depth of the course. Heat shall be applied to contact surfaces of transverse joints just before additional mix is placed against them.

- 02511.3.2 EXCESS BITUMINOUS SURFACE MATERIAL.

Material trimmed from the edges, together with any other discarded bituminous mixture, shall be removed from the roadway and disposed of by the Contractor in an approved area.

- 02511.3.3 TESTING

- 02511.3.3.1 CONTRACTOR TESTING - The Contractor shall be responsible for providing the necessary tests for controlling and maintaining the mixture within the limits indicated in the approved job-mix formula. Sampling and testing will be performed on each lot of material as it is placed. Gradation and asphalt content samples will be taken immediately behind the paver at the following rate:

LOT TESTING

Lot Size, -Sq.Yds.	Minimum Number of Samples
1500 and greater	4
Less than 1500	3

Density and thickness samples will be taken at a rate of one sample per each lot of up to 1500 square yards. When lot size exceeds 1500 square yards, two samples will be taken.

Checks for smoothness will be made at locations selected by the Engineer for each lot. Smoothness checks will not be required where transitions or variations will not allow compliance with the criteria.

Acceptance of bituminous material placed shall be made by comparing test results with the job-mix formula and the dimensions provided in these Specifications. Acceptance of each lot will be given when test results are within the following tolerances:

BITUMINOUS TEST

Test	Maximum Deviation
Asphalt Content	Mean of tests on each lot is less than 1%
Gradation	Mean of tests for any sieve size is less than 10%
Density	Any test is 92% or greater
Thickness	Any test is less than 0.5-inches
Smoothness	0.25-inches in 10-feet longitudinally or transversely

Any corrective measures necessary to bring the bituminous surface into compliance must be made while the surface temperature is still greater than 175° F.

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See Subsection 02511.5.2 - PRICE ADJUSTMENTS, below.

02511.3.3.2 ENGINEER TESTING - At his own discretion, the Engineer also may spot-check the bituminous mix for acceptability and for determination of compliance with installation requirements. These spot-checks will not be used for acceptance but for guidance. On request, the results will be made available to the Contractor by the Engineer.

02511.4 METHOD OF MEASUREMENT

02511.4.1 NO SEPARATE MEASUREMENT

No separate measurement shall be made for furnishing and installing bituminous surface when it is an integral component of a structure or facility shown as another line item in the Bid Schedule.

02511.4.2 SEPARATE MEASUREMENT

When bituminous surface is shown as a separate pay item in the Bid Schedule, measurement shall be made by counting and adding together each ton of surface in place and accepted. This measurement shall include furnishing all necessary materials and equipment, labor, weighing, mixing, hauling, placement, compaction, and testing to produce an acceptable bituminous surface.

02511.5 BASIS OF PAYMENT

02511.5.1 ACCEPTED QUANTITIES

The accepted quantities will be paid for at the contract unit price for:

PAY ITEM	UNIT
Plant Mix Bituminous Surfacing	Tons

02511.5.2 PRICE ADJUSTMENTS

02511.5.2.1

DEVIATIONS FROM CRITERIA - For deviations from criteria provided by the approved job-mix formula and in these Specifications and Drawings, the unit price shown in the Bid Schedule will be adjusted by application of the pay factor shown in the tables below:

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TABLE A - THICKNESS DEFICIENCY

Pay Factor	Average Core Thickness Deficiency (In Inches)
100	0.00 - 0.25
90	0.26 - 0.50
80	0.51 - 0.75
50	0.76 - 1.00
Remove and Replace	More than 1.00

TABLE B - NON-COMPLYING COMPACTION TESTS

Test Method	Pay Factor	Percent Of Bulk Density Target	
		Mean of all Tests	Lowest of all Tests
ASTM D 3203 (Rice Method)	1.00	95 to 100	90 or greater
	0.90	95 to 100	Less than 90
	0.80	92 to 95	90 or greater
	0.50	Less than 92	90 or greater

TABLE C - NON-COMPLYING BITUMEN CONTENT AND AGGREGATE GRADATION

Criteria	Pay Factor	Mean Deviation Of Number Of Tests In Test Lot									
		1 Test		2 Tests		3 Tests		4 Tests		5 or more Tests	
		Min	Max	Min	Max	Min	Max	Min	Max	Min	Max
Bitumen Content	1.00	0.0	0.7	0.0	0.54	0.0	0.46	0.0	0.41	0.0	0.38
	0.975	0.0	0.8	0.55	0.61	0.47	0.52	0.42	0.46	0.39	0.43
	0.95	0.0	0.9	0.62	0.68	0.53	0.58	0.47	0.52	0.44	0.47
	0.90	0.0	1.8	0.69	0.75	0.59	0.64	0.52	0.56	0.48	0.52
	0.85	0.0	1.1	0.76	0.82	0.65	0.69	0.57	0.61	0.53	0.56
½" and larger Sieve	1.00	0.0	10.0	0.0	7.3	0.0	6.3	0.0	5.6	0.0	5.2
	0.975	11.0	12.0	7.4	8.3	6.4	7.1	5.7	6.3	5.3	5.8
	0.95	13.0		8.4	9.3	7.2	7.9	6.4	7.0	5.9	6.4
	0.90	14.0		9.4	10.3	8.0	8.7	7.1	7.7	6.5	7.1
	0.85	15.0		10.4	11.3	8.8	9.5	7.8	8.4	7.2	7.7
¾" Sieve	1.00	0.0	9.0	0.0	6.9	0.0	5.9	0.0	5.3	0.0	4.9
	0.975	10.0		7.0	7.8	6.0	6.6	5.4	5.9	5.0	5.5
	0.95	11.0		7.9	8.7	6.7	7.3	6.0	6.6	5.6	6.1
	0.90	12.0	13.0	8.8	9.6	7.4	8.0	6.7	7.2	6.2	6.6
	0.85	14.0		9.7	10.5	8.1	8.9	7.3	7.9	6.7	7.2
No. 4 Sieve	1.00	0.0	9.0	0.0	6.7	0.0	5.7	0.0	5.2	0.0	4.8
	0.975	10.0		6.8	7.6	5.8	6.3	5.3	5.8	4.9	5.4
	0.95	11.0		7.7	8.5	6.4	6.9	5.9	6.4	5.5	5.9

Criteria	Pay Factor	Mean Deviation Of Number Of Tests In Test Lot									
		1 Test		2 Tests		3 Tests		4 Tests		5 or more Tests	
		Min	Max	Min	Max	Min	Max	Min	Max	Min	Max
	0.90	12.0	13.0	8.6	9.4	7.0	7.5	6.5	7.0	6.0	6.5
	0.85	14.0		9.5	10.2	7.6	8.0	7.1	7.6	6.6	7.0
No. 8 Sieve	1.00	0.0	7.0	0.0	5.6	0.0	4.8	0.0	4.3	0.0	4.0
	0.975	8.0		5.7	6.3	4.9	5.4	4.4	4.8	4.1	4.5
	0.95	9.0		6.4	7.0	5.5	6.0	4.9	5.3	4.6	4.9
	0.90	10.0		7.1	7.7	6.1	6.6	5.4	5.8	5.0	5.4
	0.85	11.0	12.0	7.8	8.5	6.7	7.2	5.9	6.4	5.5	5.8
No. 16 Sieve	1.00	0.0	7.0	0.0	5.2	0.0	4.6	0.0	4.2	0.0	3.9
	0.975	8.0		5.3	5.8	4.7	5.1	4.3	4.6	4.0	4.3
	0.95	9.0		5.9	6.4	5.2	5.6	4.7	5.1	4.4	4.7
	0.90	10.0		6.5	7.0	5.7	6.1	5.2	5.5	4.8	5.1
	0.85	11.0	12.0	7.1	7.6	6.2	6.6	5.6	5.9	5.2	5.4
No. 50 Sieve	1.00	0.0	6.0	0.0	4.3	0.0	3.8	0.0	3.4	0.0	3.2
	0.975	7.0		4.4	4.8	3.9	4.1	3.5	3.8	3.3	3.5
	0.95	8.0		4.9	5.3	4.2	4.5	3.9	4.1	3.6	3.8
	0.90	9.0		5.4	5.8	4.6	4.9	4.2	4.4	3.9	4.1
	0.85	10.0		5.9	6.4	5.0	5.5	4.5	4.9	4.2	4.5

02511.5.2.2 REMOVAL OF MIX - The Engineer may order the removal of the mix if the mean result of the lot acceptance tests deviate from the job-mix formula for a particular sieve or sieves, or if the asphalt content is more than the values shown under the 0.85 pay factor in Table C. Where material not meeting this criteria is allowed to remain, a pay factor of 0.50 will be applied.

When the tested density percentage pay factor in Table B is multiplied by the pay factor shown in Table C, and the product is less than 0.80, the Engineer may order removal of the mix. Where material not meeting this criteria is allowed to remain, a pay factor of 0.50 will be applied.

02511.5.2.3 ADDITIONAL MIX - When a lot shows a deficient thickness of more than 0.5-inches, the Engineer may order additional material to be placed and additional payment for the material required will be allowed. When excess thickness is determined, the Engineer may allow it to remain in place; however, only 50 percent of the mix in excess of the 0.5-inch tolerance will be paid for.

02511.5.2.4 OPTIMAL ASPHALT CONTENT PERCENTAGE - Optimal asphalt content percentage will be determined from the job-mix formula provided by the Contractor unless the bituminous mixture is obtained from an established commercial asphalt plant. In such case, the optimum percentage may be determined from previous mixes which meet the criteria provided in these Specifications.

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02512.1 DESCRIPTION

Includes requirements for furnishing bituminous and aggregate materials, mixing those materials in place on graded surfaces and laying and compacting those mixtures for roads, parking areas, and other traffic surfaces.

02512.1.1 RELATED WORK

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Section 02513 - Asphalt Tack Coat
Section 02514 - Asphalt Prime Coat

02512.1.2 SUBMITTALS

Not used.

02512.1.3 DEFINITIONS

Blade - The grading or manipulation of road surfacing materials with a road grader blade.

Aggregate - Crushed stone, gravel or slag with uniform particle sizes.

Gradation - A group of particle size limits that are prescribed for aggregate.

Course - A single layer of bituminous surfacing.

Mat - A single or multiple layers of bituminous surfacing, which have been placed.

02512.2 MATERIALS

02512.2.1 ASPHALT

The asphalt shall be the type and grade of asphalt shown on the Drawings and shall meet the current requirements contained in the "Standard Specifications for Paving and Industrial Asphalts" issued by the Asphalt Institute. When the asphalt type and grade are not shown on the Drawings, or in these Specifications, MC-70 or MC-250 liquid asphalt will be acceptable.

02512.2.2 AGGREGATE

Aggregate shall be crushed stone, slag or gravel meeting the quality and gradation requirements shown below in Tables 1-R and 2R, unless shown otherwise in the Special Provisions or elsewhere in the Contract Documents. At least 50 percent by weight of the particles retained on the Number 4 sieve shall have at least one mechanically fractured face. Aggregates may be sampled and tested at random and must meet the requirements below. Failure of materials to meet the requirements of these standards may result in rejection of all materials placed prior to the tests.

TABLE 1-R: CRUSHED AGGREGATE QUALITY REQUIREMENTS FOR ROAD-MIX BITUMINOUS PAVEMENT

Description	AASHTO Test Method	Requirements
Percent Wear	T 96	40 max.
Durability Index, Coarse and Fine	T 210	35 min.

Description	AASHTO Test Method	Requirements
Sand Equivalent (Alternative Method Number 2)	T176	45 min.
Stripping Test	T 182	Min. 95% coated**

** An approved chemical additive may be used to meet this requirement.

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TABLE 2-R: GRADATION LIMITS FOR CRUSHED AGGREGATE USED IN ROAD-MIX BITUMINOUS SURFACING

Sieve Size	Percent of Total Aggregate (dry weight)	
	¾-inch	
¾ inch	100	
½ inch	---	
3/8 inch	78-92	
No. 4	55-67	
No. 8	---	
No. 16	28-38	
No. 50	---	
No. 200	7-11	

02512.3 CONSTRUCTION REQUIREMENTS

02512.3.1 BITUMINOUS MIXTURE

02512.3.1.1 SCALES - If scales are not available for weighing vehicles used for hauling the aggregate and bituminous material, the Contractor shall provide such scales at no cost to the Owner.

02512.3.1.2 AGGREGATE - When aggregate on the existing surface is to be used for the bituminous mixture, that aggregate shall be scarified to the depth indicated on the Drawings and bladed into a windrow away from the surface being constructed. The exposed surface shall then be uniformly bladed and rolled, or watered and rolled to form a tight, lightly moistened surface.

When new aggregate is to be used for the bituminous mixture, the existing base shall be lightly scarified and bladed to a uniform grade to the dimensions shown on the Drawings. This graded surface shall then be rolled, or watered and rolled, to form a tight lightly moistened surface. Aggregate then shall be placed on the prepared surface and bladed into a uniform section which can be easily measured to check its volume.

If the surface moisture of the aggregate is greater than 3 percent of the dry weight of the aggregate and emulsified asphalt is not being introduced, the aggregate shall be aerated by movement until its moisture content is reduced to 3 percent or less. When an acceptable moisture content is achieved, the aggregate shall be spread into a uniform layer of convenient width for introduction of the bituminous material.

02112.3.1.3 MIXING - Mixing of materials shall be as follows:

- For blade grader mixing, application of bituminous material to the aggregate shall be accomplished with a distributor designed, equipped, maintained and operated so that bituminous material will be applied in successive applications at an even temperature and uniform rate on variable widths of surface up to 12-feet. The distributor must be capable of controlling rates of application from 0.05 to 2.0 gallons per square yard, with uniform

pressure and with a variation from the rate set not to exceed 0.02 gallon per square yard. Operable measuring equipment shall be included on the distributor which includes a tachometer, pressure gauges, accurate volume measuring devices or a calibrated tank, and a thermometer for measuring the temperature of the bituminous material in the tank. Asphalt viscosity shall range between 50 and 200 centistokes at application. Distributors shall be equipped with (1) a power unit for the pump and (2) full circulation spray bars that adjust laterally and vertically.

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- Traveling mixers shall not be used to introduce the bituminous material, unless specifically authorized in writing by the Owner. Approval also must be obtained in writing from the Owner before moving the unit to the work site.
- No more than 0.50 gallon of bituminous material shall be applied per square yard in any one application. Partially mix the asphalt material with the aggregate immediately after each application. Windrow and mix the entire surface course after the last application of asphalt by blading the mixture from side to side of the roadway. The mixture shall be blade mixed until a complete and uniform coating of the particles and a thorough distribution of the bituminous material throughout the aggregate is achieved, and no more than 50% of the original volatiles shall remain in the mix. The mixture shall be uniform in appearance, texture, asphalt content, and free from pockets of segregated aggregates. The Contractor shall not cut into the underlying base course or contaminate the mixture with earth or other foreign matter while mixing.
- Any excess or deficiency of material in the mix shall be corrected by the addition of aggregate or bituminous material as appropriate and the bituminous mixture re-mixed until it meets requirements. Should the mixture show an uneven distribution of materials, the materials shall be re-mixed until this condition is corrected.

02512.3.2 PLACEMENT

02512.3.2.1 SPREADING - The spreading of the mix shall not be started until the surface to be covered is approved by the Owner. Form the completed mixture in a windrow of approved cross section and spread in a single course to the plan elevations, grades, and cross sections.

02512.3.2.2 WINDROWING MATERIAL AT DAY'S END - At the end of each day's work or if work is halted for other reasons, all loose material shall be bladed into a windrow, whether all mixing is complete or not, and retained in that windrow until operations are resumed. Do not leave non-compacted spread material on the roadbed overnight.

02512.3.2.3 WEATHER CONDITIONS - The bituminous mixture shall not be placed when weather conditions prevent proper mixing and placing of the mixture; when the base course is frozen; or when the average temperature of the underlying surface is below 50° Fahrenheit and air temperature is rising. Placing on water covered surfaces will not be permitted.

02512.3.3 COMPACTION

02512.3.3.1 ROLLING - Steel-wheel rollers and pneumatic-tire rollers shall have a total compacting width of not less than 60-inches and a gross weight adjustable within the range of 200 to 350 pounds per inch of compaction width. All tires on the pneumatic roller shall be equally inflated and have a means of adjusting the contact pressure to suit project conditions. Roll without shoving or distorting the surface.

Initial rolling shall be with the pneumatic-tire roller and final rolling shall be completed with a steel-wheeled roller. Rollers shall begin at the sides and proceed longitudinally parallel to the center of the surface being placed, each trip overlapping 6-inches or two times the pavement depth, whichever is greater, gradually progressing to the center. When paving in echelons or abutting a previously placed lane, the longitudinal joint should be rolled first, then followed by the above rolling procedure. On super-elevated curves, the rolling shall begin at the low side and progress to the high side.

02512.3.3.2 IRREGULAR AREAS - On areas where irregularities or unavoidable obstacles make the use of mechanical equipment impracticable, (along forms, curbs, headers, walls and other places) the mixture shall be thoroughly compacted with hot hand tampers, smoothing irons or mechanical tampers.

02512.3.3.3 TOLERANCES - Finish to a smooth, uniform line and grade with surface deviations not exceeding plus or minus 3/8-inch in 10 feet.

02512.3.4 TESTING ENT 102458:2000 PG 276 of 480

02512.3.4.1 CONTRACTOR TESTING - The Contractor shall be responsible for providing the necessary tests for controlling and maintaining the mixture within the limits indicated in these Specifications and the Drawings.

02512.3.4.2 OWNER TESTING - The Owner may also make tests for spot-checking acceptability and determination of compliance with installation requirements.

02512.3.4.3 SAMPLING - Sampling and testing will be performed on each lot of material placed. A lot equals the amount of material placed during a production day. When production is less than 500 square yards per day, the Owner may not require sampling and testing.

02512.3.4.4 THICKNESS SAMPLES - Thickness samples will be taken at a rate of one sample per each lot of up to 1500 square yards. When lot size exceeds 1500 square yards, two samples will be taken. Specified thickness standards may be waived if additional thickness is required by the approved Contractor's drawings to level an existing surface.

02512.3.4.5 SMOOTHNESS CHECKS - Checks for smoothness will be made at locations selected by the Owner for each lot. A straight edge or string line shall be used to determine smoothness compliance. Smoothness checks will not be made where transitions or variations will not allow compliance with the criteria.

02512.3.5 EXCESS MATERIAL

Material trimmed from the edges and any other discarded bituminous mixture shall be removed from the roadway and disposed of by the Contractor in an approved manner conforming to State environmental codes and regulations.

02512.4 METHOD OF MEASUREMENT

02512.4.1 NO MEASUREMENT

No separate measurement shall be made for furnishing and installing bituminous mixtures when such materials are components of another structure or facility and not specifically shown on the Bid Schedule.

02512.4.2 SEPARATE MEASUREMENT

When shown as an item in the Bid Schedule, measurement shall be made for each square yard of Road Mix Bituminous Surfacing furnished, mixed, and placed, including asphalt cement, aggregate, additives, etc., used in the mixture.

02512.5 BASIS OF PAYMENT

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02512.5.1 ACCEPTED QUANTITIES

The accepted quantities will be paid for at the contract unit price for:

PAY ITEM	UNIT
Road Mix Bituminous Surfacing	Square Yard

02512.5.2 PRICE ADJUSTMENTS

02512.5.2.1 DEVIATIONS FROM CRITERIA

For deviations from criteria provided by the approved job-mix formula and in these Specifications and Drawings, the unit price shown in the Bid Schedule will be adjusted by application of the pay factor shown in the tables below:

TABLE A - NON-COMPLYING BITUMEN CONTENT AND AGGREGATE GRADATION

Criteria	Pay Factor	Mean deviation of number of tests in test lot									
		1 Test Min Max		2 Tests Min Max		3 Tests Min Max		4 Tests Min Max		5 or more Tests Min Max	
Bitumen Content	1.00	0.0	0.7	0.0	0.54	0.0	0.46	0.0	0.41	0.0	0.8
	0.975	0.0	0.8	0.55	0.61	0.47	0.52	0.42	0.46	0.39	0.43
	0.95	0.0	0.9	0.62	0.68	0.53	0.58	0.47	0.52	0.44	0.47
	0.90	0.0	1.8	0.69	0.75	0.59	0.64	0.52	0.56	0.48	0.52
	0.85	0.0	1.1	0.76	0.82	0.65	0.69	0.57	0.61	0.53	0.56
1/2" and larger Sieve	1.00	0.0	10.0	0.0	7.3	0.0	6.3	0.0	5.6	0.0	5.2
	0.975	11.0	12.0	7.4	8.3	6.4	7.1	5.7	6.3	5.3	5.8
	0.95	13.0		8.4	9.3	7.2	7.9	6.4	7.0	5.9	6.4
	0.90	14.0		9.4	10.3	8.0	8.7	7.1	7.7	6.5	7.1
	0.85	15.0		10.4	11.3	8.8	9.5	7.8	8.4	7.2	7.7
3/8" Sieve	1.00	0.0	9.0	0.0	6.9	0.0	5.9	0.0	5.3	0.0	4.9
	0.975	10.0		7.0	7.8	6.0	6.6	5.4	5.9	5.0	5.5
	0.95	11.0		7.9	8.7	6.7	7.3	6.0	6.6	5.6	6.1
	0.90	12.0	13.0	8.8	9.6	7.4	8.0	6.7	7.2	6.2	6.6
	0.85	14.0		9.7	10.5	8.1	8.9	7.3	7.9	6.7	7.2
No. 4 Sieve	1.00	0.0	9.0	0.0	6.7	0.0	5.7	0.0	5.2	0.0	4.8
	0.975	10.0		6.8	7.6	5.8	6.3	5.3	5.8	4.9	5.4
	0.95	11.0		7.7	8.5	6.4	6.9	5.9	6.4	5.5	5.9
	0.90	12.0	13.0	8.6	9.4	7.0	7.5	6.5	7.0	6.0	6.5
	0.85	14.0		9.5	10.2	7.6	8.0	7.1	7.6	6.6	7.0

02520.1 DESCRIPTION

This section covers cutting through designated sections of bituminous and/or concrete pavement surface with approved equipment in preparation for pavement removal.

02520.1.1 RELATED WORK

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Section 02500 - Removal and Replacement of Surface Improvements
Section 02200 - Trench Excavation and Backfill
Section 02208 - Flowable Backfill (required during winter months)

02520.1.2 SUBMITTALS

Not used.

02520.1.3 DEFINITIONS

Not used.

02520.2 MATERIALS

Not used

02520.3 CONSTRUCTION REQUIREMENTS

02520.3.1 SAW CUTTING

02520.3.1.1 NEATNESS IN CUTTING - Pavement cuts shall be made with a saw to produce straight vertical cuts through the full depth of the surfacing layer. The Contractor is responsible to preserve and maintain a neat clean edge on the cut pavement to facilitate pavement repair or replacement under Section 2500.

02520.3.1.2 CUT MATERIALS TO BE LEFT IN PLACE - Cut pavement materials shall be left in place. Removal of cut pavement will be included as part of other work items in this Contract.

02520.3.1.3 BROKEN PAVEMENT - When pavement has deteriorated or is severely cracked and broken, the Contractor shall discontinue cutting operations and obtain direction from the Engineer as to how cutting should proceed.

02520.3.2 WHEEL CUTTING

With written approval of the Engineer, wheel cutting may be substituted for saw cutting of bituminous pavement surface. Wheel cutting operations shall be subject to the same requirements as those for saw cutting pavement above.

02520.3.3 ROTOMILLING

Rotomilling of existing pavement is an acceptable alternative to saw cutting, providing that the resulting pavement edges are left clean and neat. Rotomilled material may be suitable for trench backfilling or as a substitute for road base. For such use, rotomilled material must meet the following conditions: that no chunks or pieces larger than one inch in any dimension are used, that it is placed in separate lifts from untreated base course, that it is compacted to 95% of its maximum density, and that it is acceptable to the Engineer and to the Owner.

02520.4 METHOD OF MEASUREMENT ENT 102458:2000 PG 279 of 400

Measurement for pavement cutting shall be made using a tape measure or other accurate measuring device to determine the number of lineal feet of pavement cut. This length shall be multiplied by the actual depth of the cut pavement layer, measured in inches, to give the number of inch feet of cut.

02520.5 BASIS OF PAYMENT

The accepted quantities will be paid for at the contract unit price for:

PAY ITEM	UNIT
Pavement Sawing	Inch/Foot

- 02900.1 DESCRIPTION
This section covers providing materials, equipment and labor necessary for installing topsoil, turf, trees, shrubs, grasses, forbs, field seeding, re-seeding, fertilizer, mulch, and soil amendments.
- 02900.1.1 RELATED WORK
Not used. ENT 102458:2000 PG 280 of 480
- 02900.1.1 SUBMITTALS
The Contractor shall submit for approval product data and seed mixtures in accordance with the requirements of Section 01300.
- 02900.1.3 DEFINITIONS
Not used.
- 02900.2 MATERIALS
- 02900.2.1 TOPSOIL
Topsoil shall be obtained from local sources, and shall have similar soil characteristics to those of the soil at the location where it is to be used. Topsoil shall be obtained from well-drained sites where it occurs to a depth of not less than 4 inches, and it shall not be obtained from bogs or marshes. Topsoil shall be fertile, friable, natural loam, reasonably free of subsoil, clay lumps, brush, weeds, litter, roots, stumps, stones larger than 2 inches in any dimension, or any other material which would inhibit the germination of seeds or the growth of the cover crop.
- 02900.2.2 TURF SEED
If not otherwise required in the Contract Documents, seed for turf sod shall be composed principally of Kentucky bluegrass (*Poa pratensis*), testing 99.9% pure live seed (PLS), or as approved. Other acceptable varieties include Merion, Baron, Fyiking, Tall Fescue, and Brome.
- 02900.2.3 TURF SOD
Turf sod shall be vigorous, viable, strongly rooted sod, not dormant or less than 2 years old, free of weeds, undesirable native grasses, insect infestations, and fungus. It shall be machine cut to a pad thickness of 1 inch (\pm 0.33 inch).
- 02900.2.4 TREES AND SHRUBS
- 02900.2.4.1 NURSERY GROWN - Trees and shrubs shall be nursery-grown, with botanical and common names of plants true to the approved names given in the latest edition of "Hortus", and shall meet the requirements of the American Standard for Nursery Stock adopted by the American Association of Nurserymen. Plants shall be sound, healthy, vigorous, symmetrically proportioned, well branched, densely foliated when in leaf, free of disease, insect pests, eggs, and larvae and shall have well developed root systems.
- 02900.2.4.2 ROOT BALLS AND PRUNING - Root balls shall be protected at all times from sun, drying winds and frost. Plants shall not be pruned prior to delivery. If balled and burlapped plants are

not installed immediately upon delivery, they shall be set on the ground and protected with moist soil or wet mulch.

02900.2.4.3 WARRANTY - Trees and shrubs shall be warranted for a period of 1 year after Substantial Completion, against death and unsatisfactory growth, except in cases resulting from Owner's neglect, abuse by others or natural phenomena. Unacceptable plant material shall be replaced at end of warranty period. Only one replacement is required.

02900.2.4 FIELD SEED MIX

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The seed mix listed below is suggested as a standard for field seeding when no other information is available. However, seed mix requirements can vary widely from area to area, and the Contractor shall contact the local office of the Natural Resources Conservation Service (NRCS) to obtain an appropriate seed species mix and application rate for the location in question. The Contractor shall follow the directions of the NRCS, the Engineer, and the property owner in doing field seeding.

SUGGESTED FIELD SEED MIX

Species	Amount (%)
Nardan Crested Wheatgrass	30
Russian Wild Rye	20
Y.B. Sweet Clover	15
Slender Wheatgrass	10
Oahe Intermediate Wheatgrass	10
Fairway Crested Wheatgrass	5
Western Wheatgrass	4
Other	6

02900.2.5 RESEEDING AND REVEGETATING

As with the field seed mix, non-field seed mix and/or vegetation requirements are usually area sensitive. Different government agencies, such as the Forest Service or the Bureau of Land Management, may have separate seed mix and vegetation requirements within the same area. The Contractor shall contact the respective property owner at their local office, address, or telephone number to obtain the appropriate reseeding and revegetating requirements and follow the same, in concurrence with the Engineer, in acquiring the appropriate seed and vegetation.

02900.2.6 MULCH

02900.2.6.1 TREE AND SHRUB MULCH - Tree and shrub mulch shall consist of well-aged fibrous or shredded bark, old sawdust, pine needles or leaf mold.

02900.2.6.2 FIELD SEED MULCH - Field seeding mulch shall be certified weed free small grain straw or native hay.

02900.2.6.3 HYDRAULIC MULCH - Hydraulic seeding mulch shall consist of pigments and wood cellulose fiber or paper pulp and shall form a blotter-like ground cover with moisture absorption and percolation properties. It shall have the ability to cover and hold the seed in contact with the topsoil, yet not inhibit the penetration of seedlings through it.

02900.3 CONSTRUCTION REQUIREMENTS

02900.3.1 SCOPE OF REQUIREMENTS

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The Contractor shall furnish all equipment, labor, topsoil, seed, seed mixes, turf, shrubs trees or other materials required to landscape, re-seed, or re-vegetate all areas disturbed by the Work, as required by the Drawings and these Specifications. The disturbed area shall be kept as small as possible.

02900.3.2 EROSION CONTROL

The condition of landscaped, re-seeded and re-vegetated areas shall be checked to determine the effectiveness of erosion control methods and materials. Checks will be made upon project completion, at three months following project completion, and at nine months following project completion. Any modifications or repairs required by the Engineer shall be promptly performed by the Contractor, at no additional cost to the Owner.

02900.3.3 TOPSOIL

02900.3.3.1 REMOVAL OF TOPSOIL - Topsoil to be saved shall be carefully removed to a depth of 24 inches, or to the actual depth of the existing layer, which ever is less, and set aside in a separate location. It shall not be mixed with the remainder of excavated material.

02900.3.3.2 REPLACEMENT OF TOPSOIL - When site work conditions permit, topsoil shall be spread as shown on the Drawings. The minimum depth of topsoil shall be 6 inches over all designated areas. Topsoil shall be fine graded to a firm even surface, matching existing slopes, with no lumps or stones present. The topsoil shall be prepared to a good condition, not muddy or hard, and shall be scarified to a friable condition if it is hard before turf is placed.

02900.3.3.3 PROTECTION AGAINST EROSION - Areas where topsoil has been spread shall be protected against erosion.

02900.3.4 TURF SEED

02900.3.4.1 SEEDBED PREPARATION - Where required, turf seed shall be installed as specified herein. Seedbed preparation shall be accomplished by spreading peat moss or manure uniformly at a rate of 3 cubic yards per 1000 square feet and worked into the soil by light tilling.

02900.3.4.2 APPLICATION - Seed shall be applied at a rate of 2 pounds per 1000 square feet using a drop (band) type spreader unless otherwise approved by the Engineer. The seed shall be divided into two halves and then distributed, half in north/south directions and half in east/west directions. Seed shall be raked into the soil, a layer of mulch shall be applied, and then lightly watered, at least four times daily for two weeks, or until the seed germinates.

02900.3.5 TURF SOD

02900.3.5.1 INSTALLATION - Where required, turf sod shall be laid across slopes such that butt joints alternate. Sod pieces shall be fitted tightly together so no joint is visible and then firmly and evenly hand tamped. The sod shall then be rolled with a 150-pound roller to level and seal all seams.

- 02900.3.5.2 WATERING - After rolling, sod shall be watered until water soaks into underlying topsoil to a depth of not more than 3 inches. For grades of 50% slope or steeper, the sod shall be secured with wooden pegs driven flush with the soil portion of the sod and 2 feet maximum on center.
- 02900.3.5.3 MOWING - Prior to Substantial Completion, sod shall be mowed as required to maintain a maximum height of 2 1/2 inches.
- 02900.3.6 TREES AND SHRUBS ENT 102458:2000 PG 283 of 480
- 02900.3.6.1 LOCATION - When required trees and shrubs shall be installed, as specified herein, at locations designated on the Drawings. Trees and shrubs to be saved and replanted shall be carefully removed, set aside, protected and preserved until they can be safely replanted.
- 02900.3.6.2 PREPARATION OF PLANTING PIT - Tree and shrub pits shall be five times the diameter of the root ball. The bed shall be prepared by loosening the soil with a tiller or shovel to a depth of 12 inches. Topsoil and organic matter shall then be added and distributed uniformly within the planting bed as necessary. The Contractor shall not proceed with planting until the pit locations and bedding are approved by the Engineer.
- 02900.3.6.4 PLANTING - The plant shall be set in the center of a hole of the proper size, plumb and straight. Burlap, ropes and all wire and other materials shall be removed, and then the excavated soil shall be returned to the hole and gently packed around the root ball. The planting shall be flooded with water to promote additional soil consolidation. The Contractor shall give care that, after settling, the top of the root collar shall be even with the adjacent finished grade. A 2-inch layer of mulch shall be applied around the base of the tree, to extend 2 feet in radius beyond the root ball.
- 02900.3.6.5 SUPPORT - Trees shall be guyed with two wires anchored securely to steel posts not less than 5 feet from the trunk, and directly opposite each other. The trees shall be protected from direct contact with the wires.
- 02900.3.6.6 PRUNING - Each plant shall be pruned with clean, sharp tools, to remove suckers and broken, badly bruised or dead branches. Tree trunks shall be wrapped with Tubex or equivalent translucent material unless directed otherwise by the Engineer.
- 02900.3.6.7 WATERING - Trees and shrubs shall be watered and maintained until Substantial Completion and defective work shall be corrected as soon as it becomes apparent and as weather and season permit.
- 02900.3.7 FIELD SEEDING
- Field seeding shall be accomplished using one of the following methods.
- 02900.3.7.1 BROADCAST - Broadcast seeding shall only be applied after October 15 and prior to April 15, unless authorized otherwise and directed in writing by the Engineer. No seed bed preparation will be required for this seeding method.
- 02900.3.7.2 DRILLING - Drilling shall be set forth in uniform rows with spacing not to exceed 8 inches and the depth set correctly for the type of seed being drilled. The minimum distribution rate shall be 20 pounds per acre, and may be more if so recommended by the local Soil Conservation Service.
- 02900.3.7.3 HYDRAULIC - For hydraulic seeding the Contractor shall use equipment designed for such work. Seed and water shall be uniformly applied to the areas scheduled to be seeded. Fertilizer, water

and approximately 1 ton per acre of hydraulic mulch shall be homogeneously mixed and uniformly applied to seeded areas.

02900.3.8 RESEEDING AND RE-VEGETATING **ENT 102458:2000 PG 284 of 480**

02900.3.8.1 RE-SEEDING - Reseeding of areas disturbed by the Work shall be accomplished with grasses compatible with the pre-construction vegetation. The Contractor shall consult the local office of the U.S. Forest Service, Bureau or Land Management, Soil Conservation Service, or other applicable affected agency, for appropriate seed species and application rates. Unless otherwise directed by the Engineer or these Specifications, reseeded shall be accomplished by broadcast seeding in accordance with this section.

02900.3.8.2 RE-VEGETATING - Re-vegetation of areas disturbed by the Work shall be accomplished with started trees and shrubs, compatible with the pre-construction vegetation, and is performed in addition to reseeded, as discussed in paragraph 02900.3.8.1 above. When re-vegetation is required, the Contractor shall consult the local office of the applicable affected agency, for appropriate species and instructions.

02900.3.9 MULCH

Mulch shall be incorporated as prescribed on the Drawings and in these Specifications. Where the slope exceeds 10%, the Contractor shall use a tie down mulching material.

02900.4 METHOD OF MEASUREMENT

02900.4.1 LUMP SUM - Lump sum measurement for landscaping shall include all grading, soil preparation, planting, furnishing materials and plants in accordance with the Drawings and these Specifications when shown as a single item in the Bid Schedule.

02900.4.2 SEPARATE MEASUREMENT - When and if applicable, separate measurements for topsoil, turf seeding, turf sod laying, reseeded, re-vegetating, mulching and planting of trees and shrubs shall be made in the units shown and as identified in the Bid Schedule.

02900.5 BASIS OF PAYMENT

The accepted quantity(s) shall be paid for at the contract unit price for:

PAY ITEM	UNIT
Landscaping	Lump Sum
Topsoil	Square Yard
Turf, Seed	Square Foot
Turf Sod	Square Foot
Trees and Shrubs	Each
Field Seeding	Acre
Re-Seeding	Acre
Mulch	Acre

02950.1 DESCRIPTION

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This section covers furnishing and installation of geotextile fabric of the type and configuration shown on the Drawings or specified in the Contract Documents.

02950.1.1 RELATED WORK

Section 02200 - Trench Excavation and Backfill
 Section 02202 - Roadway Excavation and Embankment
 Section 02201 - Earthwork for Structures

02950.1.2 SUBMITTALS

The Contractor shall submit manufacturer's descriptive literature, which identifies and describes applications, physical properties and characteristics of geotextile filter fabric materials to be used for this contract, in accordance with Section 01300 of these Specifications. Upon request of the Engineer, the Contractor shall supply samples for examination or testing.

02950.1.3 DEFINITIONS

Not used.

02950.2 MATERIALS

02950.2.1 FOR RIPRAP AND DRAINAGE CHANNELS

Unless shown otherwise on the Drawings or in Contract Documents, filter fabric materials for installation under riprap in drainage channels, or for lining structural footing drainage components shall be TREVIRA Spunbond type 011/250, MIRIFI 180/N or an approved equal with the following characteristics:

FILTER FABRIC CHARACTERISTICS

Grab Tensile Strength, ASTM D-4632	210 lb.
Elongation at Failure, ASTM D-4632	50%
Trapezoid Tear Strength, ASTM D-4533	75 lb.
Puncture Strength, ASTM D-4833	95 lb.
Mullen Burst Strength, ASTM D-3786	360 psi.
Permeability - k, ASTM D-4491	0.3 cm/sec.
Permittivity, ASTM D-4491	1.4 sec ⁻¹
Vertical Water Flow, ASTM D-4491	110 gpm/ft ²
Apparent Opening Size*, ASTM D-4751	0.210 mm

*Maximum Opening Size

02950.2.2 FOR EMBANKMENTS AND FOUNDATIONS

Requirements for geotextile fabric materials used for embankment or foundation stabilization will be provided in the Special Provisions of the Contract Documents.

02950.3 CONSTRUCTION REQUIREMENTS

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Filter fabric materials shall be installed in strict accordance with the manufacturer's instructions and recommendations. Care shall be taken at all times to prevent puncturing or tearing of the fabric materials during placement under embankment or riprap materials. Joints of fabric sheets shall be lapped in accordance with the manufacturer's instructions and fastened securely in place with fasteners to prevent gaps and misalignment during coverage with earth materials.

02950.4 METHOD OF MEASUREMENT

02950.4.1 Geotextile fabrics will be considered incidental to installation of riprap and drainage gravel envelopes and no separate measurement shall be made.

02950.4.2 When shown separately as an item in the Bid Schedule, geotextile fabric shall be measured to the nearest tenth square yard determined from field measurements of surface areas on which each type of the fabric is installed, excluding overlaps.

02950.5 BASIS OF PAYMENT

02950.5.1 When geotextile fabric materials are furnished and installed incidental to other items in the Bid Schedule, no separate payment shall be made.

02950.5.2 When shown in the Bid Schedule as a separate item, the accepted quantities will be paid for at the contract unit price for:

PAYMENT ITEM	UNIT
Geotextile Fabric (<i>Type</i>)	Square Yard

02975 HILLSIDE SITE DEVELOPMENT

02975.1 AVERAGE SLOPE DEFINITION

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For the purpose of this chapter, the definition of "average" slope shall be as follows: The average slope of the parcel of land or any portion thereof shall be computed by applying the formula,

$$S = \frac{0.00229 \text{ IL}}{A}$$

to the natural slope of the land before any grading is commenced, as determined from a topographic map having a scale of not less than one inch equals 100 feet and a contour interval of not less than 5 feet, where:

0.00229 = A conversion factor of square feet to acres

S = Average percent slope

I = Contour interval, in feet

L = Summation of the length of contour lines, in feet within the subject parcel

A = Areas in acre of the parcel being considered.

02975.2 CERTIFIED REPORT REQUIRED

It shall be unlawful for the owner, developer, or any contractor or other person to excavate, grade, level, or build upon any lot or property within the city when the average slope of the lot exceeds ten (10) percent or if such a slope is within 200 feet of the building lot. Nor shall any person grade, level, or improve in any manner any parcel of land which is crossed by a natural or manmade water course or existing utility, before such person has submitted to the chief building official a certified report from a qualified civil engineer licensed in the State of Utah containing the information set forth in the following section.

02975.3 CERTIFIED REPORT SPECIFICATIONS

The certified report required in the previous section shall contain at least the following information:

- A. A plat of the property showing the following:
 1. Contour lines at five (5) foot intervals. Existing contours shall be indicated by dashed lines and proposed contours by solid lines;
 2. Elevations at the corners of foundations and at the corners of driveways; and
 3. Show or reference any existing or potential groundwater flows which may cause unstable conditions such as debris flow or slides.
- B. Assessment of the civil engineer as to the seriousness of any development problems such as erosion, drainage, flood and geologic hazards or unstable soil conditions and their potential effect on adjoining properties and on any proposed improvements to be built on the property.
- C. The proposed method for handling the problems noted in "B" above.

02975.4 LIABILITY

The purpose of this chapter is to point out to the owner and/or developer of any property that the liability and responsibility of such persons to protect the integrity of their own and adjoining properties, existing water courses and utilities lies upon the person doing the development and upon the owner of the property being developed and not upon the city or any other person. The City may require additional information on any development or building which may have potential hazards.

03050.1 DESCRIPTION ENT 102458:2000 PG 288 of 480

This section contains requirements for Portland cement concrete materials and concrete mix designs.

03050.1.1 RELATED MATERIALS AND WORK

Section 03100 - Concrete Forming, Finishing and Curing
Section 03200 - Concrete Reinforcement
Section 03300 - Concrete Structures and Slabwork
Section 03500 - Pre-Cast Concrete Components
Section 03600 - Grout and Mortar

03050.1.2 SUBMITTALS

03050.1.2.1 PROPOSED MIX DESIGN - Each proposed mix design shall be submitted 14 days prior to its use in the Work. Indicate whether mix has been designed for pumping. Mix design submittals shall include the following information:

- Water-cement ratio.
- Proportion of materials in the mix.
- Source and type of cement.
- Analysis of water to be used, unless potable.
- Type and name of admixtures applied. Indicate when accelerating or retarding admixtures are to be used and the resulting change in placement times.
- Slump, air content, and temperature of samples.
- Unit weights of fresh and dry light weight concrete.
- Any applicable and verifiable test documentation available if the submitted mix design has been used by the Contractor in prior projects.

03050.1.2.2 AGGREGATE TEST REPORT - Aggregate Test Report (submit for each aggregate source):

- Data of test analysis.
- Sieve analysis.
- Organic impurities.
- Sodium sulfate soundness test.
- Reactivity of aggregate.
- Complete identification of source of aggregate.

03050.1.2.3 CHANGES IN MIX DESIGN - After the design of the mix or mixes has been approved by the Engineer, neither the source, character, or grading of the aggregate, nor the brand or type of cement shall be changed, without 48 hours written notice to the Engineer. Should such changes become necessary, no concrete containing such new or altered materials shall be placed until the revised mix design has been submitted to the Engineer for review and approval.

03050.1.3 DEFINITIONS

Workability - The ease of placing, consolidating and finishing freshly mixed concrete.

Consolidation - Hand rodding or mechanically vibrating actions which give freshly mixed concrete the characteristics of a thick fluid so as to minimize voids when set.

Hydration - The chemical reaction between water and calcined limestone resulting in the excellent bonding properties of the cement particles with one another and with the aggregates in the mix.

Curing - Synonymous with the hydration reaction. May be enhanced by procedures which assure the retention of sufficient moisture to allow the reaction to go as far to completion as possible.

Strength - The maximum resistance of a mortar or concrete specimen to axial compressive loading expressed in psi.

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Admixtures - Chemical additives to concrete mixes intended to adjust setting time, reduce water demands, increase workability and entrain air.

Air Entrainment - Introduction of chemicals to concrete mixtures which produce microscopic air bubbles which improve the workability and ability to resist deterioration due to freezing.

Reinforcement - Materials formed or mixed in concrete mixtures, to increase the ability of the concrete to withstand loading when set (hardened).

Water-Cement Ratio - The weight of the water divided by the weight of the cement in a concrete mixture.

Tempering - The addition of water to mixed concrete after arrival on site.

03050.2 MATERIALS

03050.2.1 CEMENT

03050.2.1.1 SITE-PLACED CONCRETE - For site-placed concrete, cement shall be Type II (low alkali) cement, meeting requirements of ASTM C-150, unless otherwise directed by the Engineer or these Specifications. Do not use cement containing lumps, or cement which has partially set. Do not mix cements originating from different sources or manufacturers.

03050.2.1.2 PRE-CAST CONCRETE - For pre-cast concrete, cement shall be Class 5000 (minimum) in accordance with ACI 318 for units to be installed above ground. For units installed below ground, concrete shall be Class 4000 in accordance with ASTM C 478 and ASTM C 858.

03050.2.2 WATER

Shall be potable or water which meets the requirements of AASHTO T-26.

03050.2.3 REINFORCEMENT

Shall be in accordance with Section 03200 of these Specifications.

03050.2.4 ADMIXTURES

03050.2.4.1 AIR ENTRAINMENT - Air entrainment of concrete shall meet the requirements of AASHTO M-154 (ASTM C-260).

03050.2.4.2 PLASTICIZERS - Water reducing agents (plasticizers) and set retarding agents shall meet the requirements of AASHTO M-194 (ASTM C-494). Only types A or F will be approved as water reducing agents and only types D or G will be approved as set retarding agents. Water reducing

agents and set retarding agents shall be pre-measured and added in strict accordance with manufacturer's instructions. Calcium chloride will not be approved.

03050.2.4.3 FLY ASH - Pozzolan (fly ash) may be used to replace a percentage of cement in the mix design in accordance with ASTM C-618, under the following conditions:

- The minimum required cement content shall be expressed in the design formula before replacement calculations are made. ENT 102458:2000 PG 290 of 480
- The amount of Portland cement replaced by pozzolan shall be not exceed 15% for exterior concrete (concrete exposed to weather) and 20% for interior concrete.
- The ratio of replacement by weight of pozzolan to cement shall be 1.25 to 1.0.
- Loss of ignition of pozzolan shall be less than 3 percent, and the water requirement shall not exceed 100 percent.
- All other requirements of this Section still apply.
- Mix designs including trial batches are required for each aggregate source and for each concrete class.
- See also Subsection 03050.2.7.4 below.

03050.2.5 AGGREGATE

03050.2.5.1 AGGREGATE RATIO - The combined weight of coarse and fine aggregate material passing the No. 200 sieve shall not exceed 1.75 percent of the total weight of aggregate. The ratio of coarse to fine aggregate shall not be less than one (1) nor more than two (2), nor shall the amount of coarse aggregate be great enough to cause difficulty in concrete placement or honeycombing in the structure.

03050.2.5.2 COARSE AGGREGATE - Coarse aggregate shall comply with AASHTO M-80, using gradations from the following table:

COARSE AGGREGATE GRADATIONS

Aggregate Size	Percent Passing (by weight)							No. 4
	Sieve Size							
	2½"	2"	1½"	1"	¾"	½"	3/8"	
2" to No. 4	100	95-100		35-70		10-30		0-5
1½" to No. 4		100	95-100		35-70		10-30	0-5
1" to No. 4			100	95-100		25-60		0-10
¾" to No. 4				100	90-100		20-55	0-10

Maximum coarse aggregate gradation shall not be larger than 1/5 of the narrowest dimension between sides of forms; shall not be larger than 1/3 the depth of slabs; shall not be larger than 3/4 of the minimum clear distance between reinforcing bars or between bars and forms, whichever is less; and shall not be larger than 2 inches.

The maximum percentage by weight of deleterious substances allowed in coarse aggregate materials shall be:

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DELETERIOUS SUBSTANCES ALLOWED IN COARSE
AGGREGATE

Substance	Percent
Soft fragments	2.0
Coal and lignite	0.3
Clay lumps	0.3
Other deleterious substances	2.0

03050.2.5.3 FINE AGGREGATE - Fine aggregate shall comply with AASHTO M-6 using gradations from the following table:

FINE AGGREGATE GRADATIONS

Sieve Size	Percent Passing (by weight)
3/8-inch	100
No. 4	95 to 100
No. 16	45 to 80
No. 50	10 to 30
No. 100	2 to 10

The maximum percentage by weight of deleterious substances allowed in fine aggregate shall be:

DELETERIOUS SUBSTANCES ALLOWED IN FINE AGGREGATE

Substance	Percent
Coal and lignite	0.3
Clay lumps	0.5
Other deleterious substances	2.0

03050.2.5.4 AGGREGATE SOUNDNESS AND REACTIVITY - As determined in accordance with ASTM C-88, potentially deleterious aggregates shall not be used unless service records have shown the aggregates to be innocuous, and the Engineer subsequently approves them in writing.

03050.2.6 MIXING REQUIREMENTS

03050.2.6.1 CONCRETE CLASSIFICATIONS - Mixing requirements for the specific concrete classes indicated on the Drawings and/or within these Specifications shall be as follows:

CONCRETE CLASSIFICATIONS

Concrete Properties	Concrete Classifications		
	5000	3500	2000
Coarse Aggregates (see requirements shown below)			
Maximum Water/Cement Ratio (gal/sack)	5.0	6.5	8.0
Minimum Cement Content (sacks/CY)	***	6.0	4.5
Slump (inches)**	2 to 4	2 to 4	2 to 5
Air Content (percent)	5.0 to 7.5	5.0 to 7.0	3.0 to 5.0
Required Average 28 Day Compression Strength Test (psi)****	5200	3700	2200
Required Minimum 28 Day Compression Strength Test (psi)****	4800	3300	1800

- Notes: * All concrete installed shall be Class 3500 unless otherwise required in the Contract Documents.
 ** When water reducing agents are not used.
 *** Cement content shall be appropriate to produce a mixture meeting the requirements for water/cement ratio and workability for the specific job conditions.
 **** One compressive strength test shall consist of the average strength of two cylinders in the test sample.

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03050.2.6.2 REQUIRED AVERAGE DAY COMPRESSIVE STRENGTH - The Contractor shall furnish and install concrete that will produce a Required Average (28) Day Compressive Strength as shown on the table above. The average of any three consecutive (28) day strength tests shall not fall below the required Minimum (28) Day Compressive Strength Test shown. If the average of any three consecutive tests falls below the Required Minimum, the average strength of the concrete shall be increased at the contractor's expense by increasing the cement content.

03050.2.6.3 WATER REDUCING AGENTS - When water reducing agents (plasticizers) are used in the concrete mixtures shown above, maximum slump requirements may be increased to 5 inches with low range water reducers and to 8 inches with high-range water reducers.

03050.2.6.4 FLY ASH - When fly ash is used in the mix, the cement in the water/cement ratio denotes the cement and fly ash combined. Cement shall be introduced into the batcher before the fly ash.

03050.2.6.5 CONCRETE PLACED IN WATER - For concrete deposited in water, add one additional bag of cement per cubic yard more than the design requires for concrete placed above water.

03050.3 CONSTRUCTION REQUIREMENTS

03050.3.1 STORING CEMENT

Bagged and bulk cement shall be stored in weatherproof enclosures to exclude moisture and contaminants.

03050.3.2 STOCKPILING AND HANDLING AGGREGATE

03050.3.2.1 CLEAN SITE - The site provided for stockpiling aggregates shall be clean with adequate space to provide separate stockpiles for coarse and fine aggregates.

03050.3.2.2 WASHING AGGREGATE - Washed aggregates shall be allowed to drain to a uniform moisture content, and stockpiles shall be built at least 48 hours before use.

- 03050.3.2.3 HEIGHT - Aggregate shall not be dropped more than 10 feet from the conveyor, nor shall cone shaped piles more than 10 feet high be built.
- 03050.3.2.4 STOCKPILE LAYERING - Stockpiles shall be built in thin layers (5 feet maximum) in such manner, to prevent spillage of aggregate over the sides of the stockpile.
- 03050.3.2.5 FROZEN MATERIALS - Stockpiles containing snow, ice, or frozen materials shall not be used.
- 03050.3.3 BATCHING MATERIALS ENT 102458:2000 PG 293 of 480
- 03050.3.3.1 SCALES - The Contractor shall provide scales or arrange for usage of scales that have been certified by State agencies within the past 12 months.
- 03050.3.3.2 BATCH MIXERS - Batch mixers shall be operated at the manufacturer's recommended drum speed. Drums and blades shall be kept free from excessive cement and mortar build up. Cement shall be introduced into the batcher before fly ash, and all admixtures shall be introduced to the mixer separately.
- 03050.3.3.3 CENTRAL MIXING PLANT - At central mix plants, all materials shall be mixed for at least 80 seconds at recommended drum speed. When more water is added to the cement mixture, the materials shall be mixed for an additional 30 seconds.
- 03050.3.3.4 MIXING PERIOD - The mixing period for truck mixers shall be maintained between 70 and 100 revolutions at mixing speed. Maintain a minimum of 90 revolutions for front end discharge trucks. Concrete mixing shall be completed before the truck leaves the batch plant yard.
- 03050.3.3.5 WATER REDUCING AGENTS - If water reducing agents are added at the site, they shall be added using injection equipment capable of rapidly and uniformly distributing the admixture. Prior to discharge, the concrete shall be mixed for a minimum of 5 minutes at a drum rate not less than 12 rpm or more than 15 rpm discharge.
- 03050.3.4 HEATING AGGREGATE AND WATER
- 03050.3.4.1 HEATING EQUIPMENT - When approved by the Engineer, the Contractor, at its own expense, may provide and operate heating equipment to heat aggregate and water because of cold weather conditions. All heating operations shall meet temperature limitations provided in these Specifications and shall conform to Standard ACI 306. The Contractor shall ensure that excessive heat does not cause "flash set" when the cement is added.
- 03050.3.4.2 UNIFORM HEATING - Aggregates shall be heated uniformly with steam or dry heat. Water shall be heated to between 70°F and 150°F when introduced into the mixer. Measures shall be taken to prevent overheating and hot spot development. No combustion products (ash, smoke, gas and etc.) shall contact the aggregate.
- 03050.3.5 COOLING CONCRETE MIXTURE
- 03050.3.5.1 COOLING EQUIPMENT - When approved by the Engineer, the Contractor, at its own expense, may provide and operate equipment to refrigerate water, provide ice or cool aggregate, to mix concrete due to hot weather conditions. All methods of cooling shall meet the requirements of ACI 305.

- 03050.3.5.2 USE OF ICE - When ice is introduced into the mixer, it shall be in such form as to be completely melted and dispersed throughout the mix at the completion of the mixing time. The mixing time shall be held to the minimum practicable, consistent with producing concrete meeting the specified requirements.
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- 03050.3.6 CONCRETE TRANSPORT
- 03050.3.6.1 TRUCKS - Concrete mixtures shall be transported only in conventional transit mixers or agitator trucks with rating plates that are readable. Trucks shall be equipped with visible water meters and revolution counters and shall be capable of measuring all water introduced into the mixing drum.
- 03050.3.6.2 LOADING - Trucks shall not be loaded:
- In excess of their rated mixing capacity, or
 - In excess of 63 percent of the drum gross volume, or
 - In quantities less than 2 cubic yards
- 03050.3.7 CONCRETE TEMPERING
- 03050.3.7.1 ADDING WATER - Concrete may be tempered through the addition of water under the following conditions:
- Water shall be added within specified time limits.
 - Wherever possible, water shall be added after the truck leaves the batch plant.
 - Water shall not be added in excess of the water/cement ratio or in excess of that specified on the batch tickets.
 - The mixing drum shall be rotated at least 30 revolutions at the manufacturer's recommended mixing speed when water is added, OR, addition of water for tempering shall be followed by 3 minutes of mixing at mixing speed prior to discharge.
 - Water shall not be added after 1/2 cubic yard or more of concrete has been discharged from the drum.
- 03050.3.7.2 LOW SLUMP - When concrete arrives at the site with a slump below specification, the Contractor may temper the mix up to the maximum approved water/cement ratio, provided:
- The mix design allows for on-site water addition;
 - The amount of water added is accurately measured to the nearest gallon;
 - The maximum slump is not exceeded; and
 - The person adding water is approved to do so by the Engineer and the concrete supplier.
- 03050.3.7.3 TEMPERING WITH PLASTICIZER - Do not deliver concrete containing plasticizer to the site unless the batch delivery ticket displays water/cement ratio prior to plasticizer addition. Tempering with plasticizer after delivery time window expiration shall not be allowed.
- 03050.3.8 CONCRETE PLACEMENT

03050.3.9 Shall be in accordance with Section 03300.
CONCRETE SAMPLING AND TESTING

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03050.3.9.1 PROCEDURE - Tests for slump, air entrainment, and temperature by an independent certified testing facility shall be provided by the Contractor. Independent test facility can be changed by Engineer at any time. Sampling and testing will be performed at the expense of the Contractor and as directed by the Engineer.

03050.3.9.1 SAMPLING FREQUENCY - Concrete sampling frequency shall be as noted below:

- A minimum of one air test (ASTM C-231) and one slump test (ASTM C 143) shall be performed for each placement over 5 cubic yards. At least one air and one slump test shall be performed for each additional load of concrete placed.
- For each test, the concrete temperature and the time shall be verified and recorded. Air and slump test results shall be recorded on batch delivery tickets.
- If an air test fails, immediately retest the same load. The concrete shall be rejected if the second air test fails to meet specified requirements. If the second air test meets specified requirements, a third test will be performed to establish concrete acceptance or rejection.
- If the slump for an individual load cannot be corrected by tempering within the mix design requirements and within the requirements of these Specifications, the load shall be rejected.
- The testing facility shall prepare test cylinders for strength testing in accordance with ASTM C-31 & ASTM C-39.
- At least one strength test shall be performed for each placement over 5 cu. yd., and one additional test for every 50 cu. yards of concrete placed or more frequently at the Engineer's discretion. Three cylinders shall be prepared for each test. One cylinder from each test may be set aside at the Contractor's request for strength verification prior to form removal. The average compressive strength of two cylinders constitutes one compressive strength test.
- The Contractor shall provide space in the work area and protect sample cylinders from disturbance for 24 hours after they are cast or until they are moved from the work area by testing laboratory personnel or under the direction of the Engineer.
- The average compressive strength shall meet the requirements shown in the table in Section 03050.3.1 for the class of concrete placed.

03050.4 METHOD OF MEASUREMENT

Measurement for concrete placed in accordance with these Specifications shall be as described in Section 03300.

03050.5 BASIS OF PAYMENT

Acceptable quantities of concrete, when measured separately, shall be paid for at the contract unit prices described in Section 03300.

03100.1 DESCRIPTION ENT 102458:2000 PG 296 of 480

Includes furnishing materials, accessories and labor required to form, finish and cure interior and exterior cast-in-place concrete.

03100.1.1 RELATED WORK

Section 03050 - Portland Cement Concrete
Section 03200 - Concrete Reinforcement
Section 03300 - Concrete Structures and Slabwork
Section 03500 - Precast Concrete Components
Section 03600 - Grout and Mortar

03100.1.2 SUBMITTALS

03100.1.2.1 SHOP DRAWINGS - When called for in these Specifications, the Contractor shall furnish shop drawings of forms for specific concrete items. Such drawings shall show general construction of forms, jointing, location of ties and other items affecting visibility.

03100.1.2.2 FORM RELEASE AGENT - Where concrete surfaces are scheduled to receive special finishes or applied coverings, which may be affected by the form release agent, submit manufacturer's instruction for use of agent.

03100.1.2.3 CHEMICAL HARDENER - Submit name, type, chemical analysis and manufacturer's recommended rate of application for chemical hardener, when specified.

03100.1.2.4 CURING COMPOUNDS - Submit manufacturer's specifications, test information, ingredients, certification, and installation recommendations for curing compounds. This information may become the basis of acceptance or rejection of the work cured by the material used. See also the submittal requirement under Membrane Curing Compounds in 03100.3.6.2 herein

03100.1.3 DEFINITIONS

Shoring - The framework installed to support formwork.

Re-Shoring - Framework installed or not removed which serves as support for form-work after concrete sets and there is less need for the support.

Form Coatings - Compound coated on forms, preventing concrete surface bonding to the forms.

Curing Compound - Liquid medium sprayed or coated on concrete to retain moisture.

03100.2 MATERIALS

03100.2.1 FORM TIES AND SPREADERS

Shall be removable or snap-off metal, designed to prevent form deflection and to prevent spalling concrete surfaces upon removal. Form ties shall be factory fabricated. Field fabricated ties will not be acceptable. The portion of the tie remaining within concrete after removal of exterior parts should be 1 inch below the outer concrete surface, and the remaining hole in the concrete surface shall not be larger than 1 inch diameter, unless approved otherwise by the Engineer.

03100.2.2 JOINT FILLER

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Shall be furnished and installed in accordance with Section 03310 herein.

03100.2.3 FORM RELEASE AGENTS

Commercial formulation form release agent compounds shall be used. Form release agents shall not bond with, stain or adversely affect concrete surfaces requiring later bond or adhesion. They shall not impede the wetting of surfaces to be cured with water or curing compounds. Surplus oil on forms and form oil on reinforcing steel and construction joints shall be removed before concrete is placed.

03100.2.4 FILLETS FOR CHAMFERED CORNERS

Shall be wood strips 3/4 inch by 3/4-inch size and of maximum possible length.

03100.2.5 MORTAR AND GROUT

Shall be furnished in accordance with Section 03600 herein.

03100.2.6 LIQUID CHEMICAL HARDENER

Shall be a colorless aqueous solution, containing a blend of magnesium fluosilicate, zinc fluosilicate and a wetting agent. The mixture shall contain not less than 2 pounds fluosilicate per gallon and shall not interfere with adhesives and the bonding of finishes where such is indicated.

03100.2.7 WATER

Water for curing shall meet the requirements of Section 03050 herein.

03100.2.8 MOISTURE RETAINING SHEETING

Shall be white, waterproof paper, polyethylene film or burlap-polyethylene sheet which meets the requirements of ASTM C-171.

03100.2.9 MOISTURE ABSORPTIVE COVER MAT

Shall be clean cotton or burlap fabric roll goods.

03100.2.10 CURING COMPOUND

Shall be a clear type with fugitive dye conforming to ASTM C-309, Type 1, unless otherwise approved by the Engineer. **CAUTION!!** The method of application of curing compound specified herein requires more product than is normally suggested by the manufacturer and that is customary in the trade. The amounts specified herein shall be applied, regardless of manufacturer's recommendation or customary practice.

03100.3 CONSTRUCTION REQUIREMENTS

03100.3.1 SITE CONDITIONS

The Contractor shall examine the condition of the area on which forms are to be installed and conditions under which the work of this Section is to be performed, and shall correct

unsatisfactory conditions which would prevent proper and timely completion of the work. Do not proceed until unsatisfactory conditions have been corrected.

03100.3.2 DESIGN OF FORM-WORK ENT 102458:2000 PG 298 of 480

03100.3.2.1 **LOADING** - Form-work shall be designed to safely support all vertical and lateral loads that may be induced by wet concrete both during the placement and afterward, until such loads can be supported by the structure itself as the concrete sets and begins to cure. Forms and falsework shall be designed to include assumed values of live load, dead load, weight of moving equipment to be operated on form-work, concrete mix, height of concrete drop, vibrator frequency, ambient temperatures, foundation pressures, stresses, lateral stability and other factors pertinent to the safety of the structure during construction.

In form-work design, provide for all openings, offsets, keyways, recesses, moldings, reglets, chamfers, blocking, screed, bulkheads, anchorage, inserts and other features as required on the Drawings.

03100.3.2.2 **TOLERANCES** - Form-work design shall call out material and components of sufficient strength, thickness, number of ties, amount of bracing, etc., to withstand the pressure of newly placed concrete without bow or deflection.

03100.3.3 FORM-WORK CONSTRUCTION

03100.3.3.1 **COMPLIANCE** - Form-work shall be constructed in compliance with ACI 347, to the exact sizes, shapes, lines and dimensions shown, and as required to obtain accurate alignment, location, grade, and level and plumb work in finished structures.

03100.3.3.2 **MATERIALS** - Form-work shall be constructed from steel, steel reinforced panels, smooth grade plywood, or other materials which may be approved by the Engineer or shown on the Contract Documents for special purposes. Plywood material with raised grain, patches, or other defects that will mar the finished surface of the concrete surface shall not be used.

03100.3.3.3 **ERECTION** - Form facing materials shall be erected, supported, braced and maintained by structural members spaced to prevent deflection. Form-work shall be tight, to prevent leakage of cement paste during concrete placement. Joints shall be solidly butted together and backed up as required to prevent leakage and fins. Forms placed in successive units for continuous surfaces shall be fitted to provide accurate alignment, free from irregularities, and within allowable tolerances. Use selected materials to obtain required finishes.

Provide for all openings, offsets, keyways, recesses, moldings, reglets, chamfers, blocking, screed, bulkheads, anchorage, inserts and other features required. Accurately place and securely support items to be built into forms. Provide formed openings for elements to be embedded in or pass through the concrete. Install accessories in accordance with manufacturer's instructions and ensure items are not disturbed during concrete placement. Set edge forms or bulkheads and intermediate screed strips for slabs to obtain required elevations and contours in the finished slab surface. Provide and secure units to support types of screeds required.

Fabricate forms for easy removal without hammering or prying against concrete surfaces. Provide crush plates or wrecking plates where stripping may damage cast concrete surfaces. Bevel wood inserts for forming keyways, reglets, recesses and the like, to prevent swelling and assure ease of removal

Form-work shall accommodate the work of all other trades where materials and products must be purchased and fabricated before the opportunity exists to verify the measurements of the adjacent construction affecting their installations. Verify size and location of all openings, recesses and chases with the trade requiring such items, and ensure that forms for openings and construction which accommodate installation by other trades, be accurately sized and located as dimensioned on the Drawings.

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03100.3.3.4 FORM RELEASE AGENT - Coat form/concrete contact surfaces with form coating compound before reinforcement is placed. Do not allow excess form coating material to accumulate in the forms or to come into contact with surfaces which will be bonded to fresh concrete. Apply in compliance with manufacturer's instructions.

03100.3.3.5 CLEANING - Thoroughly clean forms and adjacent surfaces to receive concrete. Remove chips, wood, sawdust, dirt and other debris just before concrete is placed.

03100.3.3.6 TOLERANCES - The Engineer recognizes that, given the realities of the physical world, there are times when formwork for concrete cannot be constructed closely enough to yield zero tolerances in the finished work. Therefore, the following tolerances are allowed but shall not be exceeded:

- In general, deviation in alignment of slabs and walls shall not exceed $\frac{1}{4}$ inch in the horizontal or vertical dimensions of a pour. All slabs which are indicated to be level shall have a maximum deviation of $\frac{1}{8}$ inch in 10 feet without any apparent change in grade.
- The maximum tolerance from true level and plumb throughout the entire length and/or height of a structure shall be $\pm \frac{1}{4}$ inch and without any abrupt changes from one part of the pour to another.
- Form-work construction for circular structures shall be allowed a maximum deviation in the arc of $\frac{1}{4}$ inch in each 10 feet of radius; therefore, as an example, a tank with a 50 foot radius shall be allowed a maximum deviation of 1-1/4 inch from the center of the tank to the arc of the wall. In circular construction, the Contractor also is allowed to deviate from the finish line shown on the Drawings through the use of form panels, which will give chord lengths not to exceed 2 feet.

In the event that deviation from the Drawing dimensions results in problems in the field, the Contractor shall be responsible for resolution of the conditions, as approved by the Engineer, without additional expense to the Owner.

03100.3.4 REMOVAL OF FORMS

03100.3.4.1 CONSIDERATIONS ASSOCIATED WITH FORM REMOVAL - Forms shall be removed in a manner to insure complete safety of the structure. Forms shall not be removed until concrete has sufficient strength to carry its own weight and the loads upon it with safety. Do not pry against face of concrete; use only wooden wedges.

03100.3.4.2 MINIMUM ELAPSED TIME - Forms shall not be removed sooner than the minimum elapsed times given in the following schedule unless allowed otherwise in the Contract Documents or as directed by the Engineer.

When directed by the Engineer, because of weather conditions or for other reasons, the forms shall remain in place for longer periods than stated below. The periods of time for form removal set forth below are minimums with no allowances for external loading. The periods of time set

forth below are permissive only and do not relieve the Contractor from responsibility for risks associated with form removal.

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MINIMUM ELAPSED TIME

Structural Component	Over 50°F	Between 40° and 50°F
Walls and perimeter forms at slab on grade panels	2 days	3 days
Underside of slabs	10 days	14 days
Side forms of beams	2 days	3 days
Underside of beams	10 days	14 days
Stairways	10 days	14 days

The time periods shown above are based on concrete materials being mixed and placed in accordance with these Specifications. When high early strength inducing admixtures are used in concrete, the Engineer may permit form removal after shorter times than those shown in the table. Form removal time also may be reduced if test cylinders of concrete, field cured along with the concrete they represent, have reached the strength specified in Paragraph 03050.3.1 of Section 03050 - Portland Cement Concrete.

03100.3.4.3

RE-SHORING - Where no re-shoring is planned, leave forms and shoring used to support weight of concrete in beams, slabs and other concrete members in place until concrete has attained its specified strength. Where re-shoring is planned, supporting form-work may be removed when concrete has reached 70 percent of specified strength, provided re-shoring is installed immediately.

Place re-shores as soon as practical after stripping operations are complete, but in no case later than the end of the working day on which stripping occurs. During re-shoring, do not subject concrete in beam, slab, column or any other structural member to combined dead, construction, and live loads in excess of loads permitted for developed concrete strength at time of re-shoring. Tighten re-shores to carry required loads without over stressing.

Re-shores shall remain in place until the supported concrete has reached its specified strength.

03100.3.5

CONCRETE FINISHING

03100.3.5.1

FINISHING FORMED SURFACES - Within 72 hours after forms are removed, the Contractor shall finish exposed surfaces in accordance with one of the procedures described below. Where no finish requirement is provided on the Drawings, formed concrete surfaces exposed to view and surfaces designated to receive paint shall be given a "Smooth" finish and slabs shall be given a "Trowel" finish. When workmanship is less than the acceptable standard, provide one of the rubbed finishes at no additional cost to Owner.

- F1 - As Cast Form Finish - No finish.
- F2 - Rough Finish - Patch defects and chip or rub off fins exceeding 0.33 inch height.
- F3 - Smooth Finish - In addition to the rough finish requirements, patch tie holes and defects and remove fins completely. When surface texture is impaired and form joints misaligned,

grind, bush-hammer or correct such areas. Slurry grout areas evidencing minor mortar leakage to match adjacent concrete. Repair major mortar leakage as a defective area.

- F4 - Smooth Rubbed Finish - Remove forms and perform necessary patching as soon after placement as possible. Finish newly hardened concrete no later than 24 hours following form removal. Perform a smooth finish, then wet surfaces and rub with carborundum brick or other abrasive until uniform color and texture are produced. **ENC 102458:2000 PG 301 of 480**
- F5 - Grout Cleaned Rubbed Finish - Undertake this operation after all contiguous surfaces are completed and accessible. Perform a smooth finish, then brush blast with abrasive basting to open surface pores. Wet surface of concrete sufficiently to prevent absorption of water from grout. Mix grout in accordance with Section 03600 and rub a uniform coat over surface to be finished. Immediately after grouting, scrub surface with cork float or stone to coat surface and fill voids. While grout is still plastic, remove excess grout by working surface with rubber float or sack. After surface whitens from drying, rub vigorously with clean burlap. Keep damp for at least 36 hours after final rubbing.
- F6 - Cork Floated Rubbed Finish - Remove forms within 2 to 3 days of placement where possible. Perform a smooth finish and then dampen wall surface. Mix mortar in accordance with Section 03600, and apply with firm rubber float or with trowel, filling all surface voids and compress mortar into voids. If mortar surface dries too rapidly to permit proper compaction and finishing, apply a small amount of water with fog sprayer. Produce a final texture with a cork float using a swirling motion.
- F7 - Unformed Finish - After concrete is placed, strike smooth, tops of walls or buttresses, horizontal offsets and similar unformed surface occurring adjacent to formed surfaces. Float to texture which is reasonably consistent with formed surface. Continue final treatment on formed surfaces uniformly across unformed surfaces.
- F8 - Blasted Finish - Complete a smooth finish then perform abrasive blasting within 24 to 72 hours after casting. Coordinate with form-work construction, concrete placement schedule and form-work removal to ensure that surfaces are blasted at the same age for uniform results. Reapply curing protection after blast finishing.
- F9 - Architectural Finish - Finish in accordance with ACI 303.
- F10 - Tooled Finish - Dress thoroughly cured concrete surface with electric, air or hand tools to uniform texture, and give a bush hammered surface texture. Remove sufficient mortar to exposed coarse aggregate in relief and to fracture coarse aggregate for tooled finish.

03100.3.5.2 REPAIRING FORMED CONCRETE SURFACES - When the Drawings indicate repairs are required or when the Engineer determines areas are defective and require repair, the following procedure shall be taken to make repairs:

- Remove defective concrete to sound concrete and make edges perpendicular to surface or slightly undercut. Feathered edges are not permitted.
- Dampen area to be patched and at least 6 inches surrounding it.
- Prepare bonding grout by mixing to consistency of thick cream and brush into surface.
- Tie holes shall be cleaned, thoroughly dampened, and filled solid with patching mortar.

- Make any patches in concrete to closely match color and texture of surrounding surfaces. Determine mix formula for patching mortar by trial to obtain a good color match with concrete when both patch and concrete are cured and dry.
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- Mix white and gray Portland cement as required to match surrounding concrete to produce grout having consistency of thick paint. Use a minimum amount of mixing water.
- Mix patching mortar in advance and allow to stand, without addition of water, and without frequent manipulation, until it has reached a stiff consistency. After surface water has evaporated from patch area, brush bond coat into surface. When bond coat begins to lose water sheen, apply patching mortar. Thoroughly consolidate mortar into place and strike-off to leave patch slightly higher than surrounding surface. Leave undisturbed for at least 1 hour before final finish. Keep patched area damp for 72 hours or apply curing compound.
- Do not use metal tools in finishing an exposed patch.
- Where as cast finishes are indicated, total patched area may not exceed 1 in 500 of as cast surface. This is in addition to form tie patches, if ties are permitted to fall within as cast areas.
- In any finishing process which is intended to expose aggregate on surface, patched areas must show aggregate. Outer 1-inch of patch shall contain same aggregates as surrounding concrete. After curing, expose aggregates together with aggregates of adjoining surfaces by same process.

03100.3.5.3

FINISHING SLAB SURFACES - In no case shall water be added to the surface (i.e., by sprinkling) to finish. Slab surfaces shall receive one of the following finish treatments as indicated on the Drawings:

- S1 - Floated Finish - After concrete has been placed, consolidated, struck-off and leveled, do not work further until ready for floating. Begin floating when water sheen has disappeared and surface has stiffness sufficient to permit operation. During or after first floating, check plainness of entire surface with a 10 foot long straightedge applied at 2 or more different angles. Cut down high spots and fill low spots to the required tolerance. Re-float slab immediately to a uniform sandy texture.
- S2 - Trowel Finish - Float finish the surface. Power trowel or hand trowel as required to provide a uniform surface. Do not apply (i.e. sprinkle) water or dry cement to surface of concrete when finishing. First troweling after floating shall produce smooth surface relatively free of defects, but may still show some trowel marks. Second trowel by hand after surface has hardened. Leave finished surface essentially free of trowel marks, uniform in texture and appearance. On surfaces intended to support floor coverings, grind off defects which would show through floor coverings.
- S3 - Broom Finish - Trowel finish the surface. Power trowel or hand trowel as required to provide uniform surface. Lightly brush surface parallel to direction of drainage with a hair broom. Coarseness of broom bristle may be varied slightly, to achieve desired degree of surface roughness.
- S4 - Exposed Aggregate Finish - Immediately after surface of concrete has been leveled to tolerance and surface water has dissipated, spread aggregate uniformly over surface to provide complete coverage to the depth of a single stone. Embed aggregate into surface by light tamping. Float surface until embedded aggregate is fully coated with mortar and surface

has been brought to tolerance. Start exposure of aggregate after matrix has hardened sufficiently to prevent dislodgement. Flow ample quantities of water, without force, over surface of concrete while matrix encasing aggregate is removed by brushing with a fine bristle brush. Continue until aggregate is uniformly exposed. An approved chemical retarder sprayed onto freshly floated surface may be used to extend working time.

- S5 - Chemical Hardener Finish - Apply liquid chemical hardener finish to interior concrete floors where indicated. Do not apply liquid chemical concrete hardener on floor areas scheduled to receive synthetic matrice terrazzo, setting beds for tile, terrazzo, vinyl flooring or like items. Apply hardener after complete curing and drying of concrete surface in accordance with manufacturer's recommendations. Evenly apply each coat and allow 24 hours for drying between coats. After final coat of chemical-hardener solution is applied and dried, remove surplus hardener by scrubbing and mopping with water.

03100.3.6

CONCRETE CURING

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03100.3.6.1

SURFACES WITH UNREMOVED FORMS - When forms are left in place (i.e., underside of beams, etc.) the Contractor shall proceed with curing adjacent surfaces without regard to the formed surfaces. When such forms are removed, curing shall then proceed over the entire surface.

03100.3.6.2

CURING CONDITIONS - Immediately after finishing of concrete surfaces (formed or slab) the Contractor shall verify concrete surfaces are ready for curing. The Contractor shall correct any conditions detrimental to timely and proper completion of the work. Do not proceed until unsatisfactory conditions are corrected. A minimum ambient temperature of not less than 40° shall be maintained for at least 7 days during concrete curing. Concrete shall then be cured by one of the following methods:

- Moisture Cover - Water or continuous water-fog spray shall be applied, or the concrete surface shall be covered with water saturated absorptive mat kept continuously soaked, for not less than 7 days and nights.
- Moisture Retaining Sheet - Place cover in widest practicable width with sides and ends lapped and sealed to prevent moisture loss for a period of not less than 7 days and nights. All holes or tears in the cover sheet shall be kept repaired during the curing period.
- Membrane Curing Compound - All required repairs, patching, and final finishing operations shall be completed prior to application. Curing compound shall be applied as soon as the concrete is firm enough to work on. Slab surfaces shall be coated with curing compound within one hour after form removal; if more than one hour has elapsed, the surface shall be water cured.

The compound shall be thoroughly mixed and a minimum of two coats shall be applied, with each coat applied in a direction different from that used for the preceding coat. The surface shall be coated and re-coated in a continuous operation until the surface has a uniform appearance; is effectively and completely sealed; and until a coating film remains on the surface of the concrete that can be scraped from the surface at any and all points after drying for at least 24 hours. Continuity of the coating shall be maintained, and all damage to the curing compound membrane shall be repaired, during the specified cure period.

Curing compound shall not be allowed within the silhouette of any construction joint. If any curing compound enters the construction joint, the joint shall be sandblasted prior to placing any new concrete.

Curing compound shall not be used on surfaces to be painted or coated.
Surfaces intended to contain potable water (tank interiors, etc.) shall not be cured with curing compounds.

Curing compound shall not be removed in less than 7 days from the time of application without written approval from the Engineer. When approved and prior to such removal, the Contractor shall provide a detailed plan for adequately curing the concrete.

03100.4 METHOD OF MEASUREMENT

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Unless otherwise noted in the Special Provisions, separate measurement will not be made for concrete included as components of items shown in the Bid Schedule. Separate measurement for formed concrete and slabs shall be in accordance with the requirements of Section 03300.

03100.5 BASIS OF PAYMENT

Unless otherwise noted in the Special Provisions, no separate payment will be made for concrete included as components of items shown in the Bid Schedule. Separate payment for formed concrete and slabs shall be in accordance with the requirements of Section 03300.

03200.1 DESCRIPTION

Includes steel bars, wire fabric and rod mats required for cast-in-place concrete, with the necessary support chairs, bolsters, bar support and spacers required for supporting the reinforcement.

03200.1.1 RELATED Work

Section 03050 - Portland Cement Concrete
 Section 03300 - Concrete Structures and Slabwork

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03200.1.2 SUBMITTALS

03200.1.2.1 MILL TEST CERTIFICATION - Manufacturer's mill test certificates of supplied concrete reinforcement, indicating physical and chemical analysis shall be submitted.

03200.1.2.2 WELDER CERTIFICATION - Each welder's certification data shall be submitted to and approved by the Engineer prior to performance of welding on the project.

03200.1.2.3 SHOP DRAWINGS - Shop Drawings shall be submitted and shall indicate the sizes, spacings, locations and quantities of reinforcing steel and wire fabric; bending and cutting schedules; any proposed splicing; and reinforcement support, spacing devices and stirrup spacing.

03200.1.2.4 BAR SUPPORT SAMPLES - The Contractor shall submit for the Engineer's approval, samples of all bar supports it proposes to use along with a written description of where each type of bar support would be used.

03200.1.3 DEFINITIONS

Not used.

03200.2 MATERIALS

03200.2.1 CONCRETE REINFORCEMENT MATERIALS

03200.2.1.1 STEEL REINFORCEMENT - Unless otherwise specified, reinforcing steel shall be grade 60 billet steel conforming with ASTM A-615, including supplementary requirements S1. All such reinforcing shall be deformed steel bars with deformations in accordance with ASTM A-615. Bars shall be either uncoated or coated as indicated. ASTM A-706 steel shall be used if welding is indicated or allowed. All reinforcement shall be supplied in the maximum lengths practical or as indicated, unless otherwise authorized by the Engineer.

03200.2.1.2 WIRE FABRIC - Welded steel wire fabric shall be in accordance with ASTM A-185 plain type. It shall be new stock and free of any rust when placed in the Work. Wire fabric may be supplied in flat sheets or coiled rolls, and may be either coated or uncoated as indicated.

03200.2.1.3 STIRRUPS - Stirrup steel shall be in accordance with ASTM A-82.

03200.2.1.4 SPIRAL REINFORCEMENT - Spiral reinforcement for columns or other components shall be cold drawn steel wire in accordance with ASTM A-82.

03200.2.1.5 DOWEL BARS - Plain dowel bars for expansion joints shall be in accordance with ASTM A-615, 60-ksi-yield grade steel. Dowel bars shall be epoxy coated in roadway pavements. Metal dowel

cans shall be provided at one end of dowel to permit longitudinal movement of the dowel within the concrete section. The Contractor shall provide for movement equal to the joint width plus 0.5-inch. Load transfer bars shall be painted with 1 coat of paint conforming to AASHTO M-254 and coated 1/2 with grease.

03200.2.2 ACCESSORY MATERIALS

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03200.2.2.1 TIE WIRE - Tie wire shall be 16-gauge minimum cold drawn plain steel wire, and shall be in accordance with ASTM A-82.

03200.2.2.2 REINFORCEMENT SUPPORTS - Unless otherwise required in the Drawings or these Specifications, reinforcement supports bolsters, chairs, spacers and other devices for spacing, supporting and fastening reinforcement in place shall be wire type bar supports complying with CRSI recommendations. Wood, brick, and other unacceptable materials will not be allowed.

03200.2.2.3 SUPPORTS EXPOSED TO VIEW - Where support legs are in contact with forms on concrete surfaces exposed to view, supports shall be stainless steel or shall be provided with either hot-dip galvanized or plastic protected legs.

03200.2.3 FABRICATION

03200.2.3.1 STANDARDS - Steel reinforcement shall be cut, bent and fabricated in accordance with ACI 315 and with approved machine methods, in either the shop or the field.

03200.2.3.2 BENDING - Bars shall be accurately formed to the dimensions shown on the Drawings or applicable bending schedule. Bending or straightening in the shop or the field shall be accomplished so that the steel is not damaged. All bars shall be cold bent. Bends for hooks on bars shall be made around a pin having a diameter not less than 6 times the minimum thickness of the bar. Kinked bars shall not be used. Bars with bends not indicated on Drawings or final Shop Drawings shall not be placed in the Work. Reinforcement bars shall not be bent after they are embedded in concrete.

03200.2.3.3 SPLICES - Reinforcing splices not indicated on the Drawings shall be approved by the Engineer, and shall be located at points of minimum stress. The location of splices shall be indicated on Shop Drawings. Welding of reinforcing bars, when authorized by the Engineer, shall be performed in accordance with AWS D1.4. All rebar which is welded shall be grade 60 ASTM A706 material.

03200.3 CONSTRUCTION REQUIREMENTS

03200.3.1 DELIVERY AND STORAGE

03200.3.1.1 DELIVERY - Deliver reinforcement to the job site bundled, tagged and marked. Use metal tags indicating bar size, lengths and other information corresponding to markings shown on placement diagrams.

03200.3.1.2 STORAGE - Take all means necessary to protect reinforcement materials before, during and after installation and to protect the installed work of other trades. Store all reinforcement materials in a manner to prevent excessive rusting and fouling with grease, dirt and other bond breaking coatings. Take all necessary precautions to maintain identification after bundles are broken. In the event of damage or errors, immediately make all repairs or replacements necessary and at no additional cost to the Owner.

- 03200.3.2 REINFORCEMENT ERECTION ENT 102458:2000 PG 307 of 480
- 03200.3.2.1 CLEAN AND SOUND MATERIALS - At the time of placement in the Work, reinforcement shall be free of loose mill scale, loose or excessive rust, paint, oil or grease, or other coating which may destroy its bond with the concrete. Bars with reduced cross-section due to rusting or other cause, even if all rust has been removed, shall not be allowed in the Work.
- 03200.3.2.2 CLEARANCE - Maintain the distance from vertical forms and between layers of reinforcement by means of prefabricated chairs, ties, hangers or other approved devices in accordance with "reinforcement support" paragraphs below. Placement and fastening of reinforcement in each section of the Work must be approved before concrete is placed.
- 03200.3.2.3 CLEAR DISTANCE - The clear distance between parallel bars shall not be less than one and one-half times the diameter of the bars, and shall in no case be less than 1 inch nor less than the maximum size of the coarse aggregate specified.
- 03200.3.2.4 MINIMUM COVER - Unless otherwise shown on the Drawings or approved by the Engineer, for all formed surfaces, the minimum concrete cover over the steel reinforcement shall be 1 1/2 inches for bars number 5 and smaller and 2 inches for bars number 6 through 18. The largest specified cover shall be used when different sized bars are encountered in the same face. No "bury" or "carrier" bars will be allowed unless specifically approved by the Engineer.
- 03200.3.2.5 CUTOUTS AND OPENINGS - Where reinforcing steel has to be cut to permit passage of pipe or to create openings with no detail available on the Drawings for extra reinforcement in such areas, the area of steel removed by the creation of the opening must be replaced by placement of at least double the area of the steel removed equally around the openings created. The steel shall be placed such that it extends 5 feet beyond the opening on each side, to provide for sufficient bond.
- 03200.3.2.6 METAL MESH - Sheets of metal mesh shall be bent as shown or required on the Drawings to fit the work. It shall be rolled or otherwise straightened to make a perfectly flat sheet before placement in the Work. Supports for metal mesh shall meet requirements for reinforcing bar supports.
- Sheets of metal mesh shall be spliced in accordance with ACI 318 and shall be overlapped no less than 12 inches or one square plus 6 inches, whichever is greater, to maintain a uniform strength. The mesh shall be securely fastened at the ends, edges and at all supports to maintain clearances and overlaps.
- 03200.3.2.7 NOTICE TO OTHER TRADES - The Contractor shall ensure that all other crafts, sub-contractors, engineering support groups, and etc., whose work is related to concrete placement, are provided with ample notice and opportunity to introduce and finish required embedded items before concrete placement. All sleeves, inserts, anchors and any other embedded items shall be located and set in place prior to concrete placement. All voids in embedded items shall be temporarily filled to prevent entry of concrete.
- 03200.3.3 SPLICING
- 03200.3.3.1 ENGINEER APPROVAL - Except as shown on the Drawings, reinforcing steel shall not be spliced at any location without specific written approval of the Engineer. Splices in adjacent bars shall be staggered as directed by the Engineer.

03200.3.3.2 LAP SPLICES - Unless shown otherwise on the Drawings, or approved by the Engineer, bars up to and including number 11 shall be lap spliced in accordance with ACI 318 and shall be fastened together with steel wire.

Unless shown otherwise on the Drawings, or approved by the Engineer, bars at a lap splice shall be in contact with each other, and in no case shall the lap be less than 40 diameters of the spliced bars.

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Unless shown otherwise on the Drawings, or approved by the Engineer, where bars are to be lap spliced at joints in the concrete, all bars shall project from the concrete first placed for a minimum length equal to the lap splice length as indicated on the Drawings. All concrete or other deleterious coating shall be removed from dowels and other projecting bars by wire brushing or sand blasting before the bars are embedded in a subsequent concrete placement.

03200.3.3.3 WELDING - Reinforcing steel shall be welded only if shown on the Drawings, or approved in writing by the Engineer. All welding of reinforcing steel shall comply with AWS D1.4.

03200.3.3.4 EXPANSION JOINTS - Reinforcement, or other embedded metal items bonded to the concrete, shall not be permitted to extend continuously through any expansion joint, with the exception of dowels in floors bonded on only one side of joint.

03200.3.4 REINFORCEMENT SUPPORT

03200.3.4.1 PLACEMENT - All reinforcement shall be supported and retained in place, true to indicated lines and grades, by the use of approved bar supports, sized to position the steel in the exact location required on the Drawings. Supports shall be spaced at intervals of not more than 5 feet on center in any direction, to prevent movement of the steel during concrete placement. Deck steel shall be tied down to beams or forms at regular intervals not exceeding 5 feet on center in any direction.

03200.3.4.2 CONCEALMENT - Supports shall be completely concealed in the concrete and shall not discolor or otherwise mar the surface of the concrete.

03200.3.4.3 SAND PLATES - Supports with sand plates or horizontal runners shall be used for slabs on grade where the base material will not support chair legs.

03200.3.5 QUALITY COMPLIANCE

Reinforcing materials found to be damaged or at variance with the requirements of the Drawings or these Specifications for size, quantity, strength, position, arrangement, or other attribute, shall result in rejection of the concrete Work if they are not brought into compliance.

03200.4 METHOD OF MEASUREMENT

03200.4.1 NO MEASUREMENT

Unless shown otherwise, concrete reinforcement shall be included with the concrete item within which it is installed and no separate measurement shall be made.

03200.4.2 SEPARATE MEASUREMENT

When shown as a separate item on the Bid Schedule, measurement of reinforcing steel will be, based on the theoretical or calculated number of pounds placed and accepted according to the requirements of the Drawings and these Specifications. Measurement shall exclude splice bars

03300.1 DESCRIPTION

Covers concrete placement operations for cast-in-place structural building frames, slabs and other components.

03300.1.1 RELATED WORK

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Section 03050 - Portland Cement Concrete
 Section 03100 - Concrete Forming, Finishing and Curing
 Section 03200 - Concrete Reinforcement
 Section 03310 - Concrete Joints for Slabwork
 Section 03600 - Grout and Mortar

03300.1.2 SUBMITTALS

03300.1.2.1 RECORD OF PLACED CONCRETE - Contractor's record of placed concrete, which indicate the date, time, temperature, location, quantity, names/types of any additives used, and type of curing materials or procedures used.

03300.1.2.2 DELIVERY TICKETS - Copies of delivery tickets which indicate the date and time of delivery; the producer and the truck number; the volume of delivery; and the amounts (weights) of cement, aggregates and any additives, including all water added at plant and in the field.

03300.1.3 DEFINITIONS

Not used.

03300.2 MATERIALS

03300.2.1 CONCRETE

Shall meet Class and material requirements of Section 03050.

03300.2.2 BONDING COMPOUND

Shall be polyvinyl acetate or acrylic base, non-rewettable type.

03300.2.3 VAPOR BARRIER

Shall be minimum 6 mil thick, polyethylene sheet, and the Contractor shall allow for 6 inch overlap at all edges, unless shown otherwise on Drawings. Vapor Barrier required for below grade application shall be free from pin holes, tears, scars and other defects.

03300.2.4 FORMS

Shall meet requirements of Section 03100.

03300.2.5 REINFORCEMENT

Shall meet requirements of Section 03200.

used to replace test samples. No deductions will be made for any bends except for hooks. The length of the bar to be added to out-to-out dimensions of hooked bars will be shown on the plans. The weight calculations shall be based upon the following table:

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WEIGHT CALCULATIONS FOR REINFORCING STEEL

Size	Lbs. per Lineal Foot	Size	Lbs. Per Lineal Foot
1/3 inch	0.167	#8	2.670
#3	0.376	#9	3.400
#4	0.668	#10	4.303
#5	1.043	#11	5.313
#6	1.502	#14	7.650
#7	2.044	#18	13.600

03200.5

BASIS OF PAYMENT

The accepted quantities of reinforcing steel will be paid for at the contract unit price. No allowance will be made for clips, wires or other material used for fastening reinforcement in place.

Payment will be made under:

PAY ITEM	UNIT
Reinforcing Steel	Lb.

03300.2.6 COVERINGS AND CURING COMPOUND

Shall meet requirements of Section 03100.

03300.2.7 GROUT

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Shall meet requirements of Section 03600.

03300.2.8 WATERSTOP

Water stop shall be of the materials described and placed in the joints where shown on the Drawings and called for in these specifications. Precautions to insure proper support and location for the water stop during concrete placement shall be taken.

03300.3 CONSTRUCTION REQUIREMENTS

03300.3.1 PREPARATION

03300.3.1.1 ENGINEER NOTIFICATION - The Engineer shall be given not less than 24 hours notice of a pour before it starts.

03300.3.1.2 REINFORCEMENT AND OTHER MATERIALS - All anchors, seats, plates, reinforcement and other items, to be embedded or cast into concrete, shall be accurately placed, held securely, and not impede concrete placement.

03300.3.1.3 CONSTRUCTION LOADS - The Contractor shall ensure that construction loads shall not exceed member capacity.

03300.3.1.4 PREVIOUSLY PLACED CONCRETE - The Contractor shall prepare previously placed concrete by bush hammering or cleaning with steel brush, as required by the Drawings or these Specifications, and by application of the required bonding compound in accordance with manufacturer's instructions.

03300.3.1.5 DOWELING TO EXISTING WORK - At locations where new work is to be doweled to existing work, the Contractor shall drill 1 inch minimum oversize holes 20 bar diameters deep into the existing concrete. Holes shall be thoroughly cleaned with oil free air filled with epoxy grout from the bottom out, then insert the dowel full depth.

03300.3.1.6 TEMPERATURES - Temperature at the time of placement shall meet requirements provided in Section 03050 and Subsection 03300.3.4.1 below.

03300.3.1.7 DELIVERY - The Contractor shall ensure that concrete delivery meets all requirements of Section 03050.

03300.3.2 CONCRETE PLACEMENT

Concrete shall be conveyed, deposited and consolidated by methods that preclude separation or loss of ingredients.

03300.3.2.1 CONVEYING OF CONCRETE - Conveying of concrete shall be carried out as follows:

- Chutes for conveying concrete shall be sloped to permit concrete of the required consistency to flow without segregation.

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- Where necessary, chutes shall be supplied with baffle boards or a reversed section at the outlet.
- Concrete shall not be allowed to drop more than 6 vertical feet without the assistance of pipes or tremies.

03300.3.2.2 DEPOSITION OF CONCRETE - Deposition of concrete shall adhere to the following requirements:

- Concrete shall not be placed if the subgrade is muddy, soft, or frozen.
- Concrete shall be deposited as near to its final position as practical.
- Use of vibrators for shifting concrete is not permitted.
- Concrete shall be placed in horizontal layers insofar as practical with placement starting at the low point and proceeding up grade.
- Concrete slabs or footings shall be placed on compacted soil surfaces and the subgrade shall have a dampened condition. To achieve the dampened condition, the subgrade may be sprinkled with water in advance of placing concrete.
- Concrete placement shall be continuous between construction joints and shall be terminated with square ends and level tops unless otherwise shown on the plans.
- Concrete shall not be placed in horizontal sections until the concrete in the adjoining vertical members has been consolidated and 2 hours has elapsed to allow for shrinkage.
- Where concrete is to be deposited against hardened concrete joints, placement shall not begin until a grout mixture has been coated on the joint. This grout mixture shall consist of mixture prescribed in Section 03600.

03300.3.2.3 CONSOLIDATION OF CONCRETE - Consolidation of concrete, except for slope paving and concrete placed underwater, shall be accomplished through the use of vibrators as follows:

- A sufficient number of spare vibrators shall be kept available to preclude interruption of concrete placement due to vibrator failure and to have the capacity to consolidate the concrete mass within 15 minutes after placement in the forms.
- The location, manner and duration of the application of the vibrators shall be such as to secure maximum consolidation of the concrete without separation of the mortar and coarse aggregate, and without causing water or cement paste to flow to the surface.
- Vibrators shall be operated so as not to contact the subgrade, reinforcing steel or form work, and shall not be used to move the mass of concrete horizontally.
- External vibration, except for vibrating screeds, shall not be used, unless approved by the Engineer prior to the start of concrete placement.

03300.3.3 WATERSTOPS

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Waterstops in the walls shall be carried into the slabs below and shall join the waterstops in the slabs with factory-made fittings or welded joints. All joints in water-bearing structures shall have waterstops, whether indicated on the plans or not. For other location requirements for waterstops, see the general notes of the plans.

03300.3.4 TIME LIMITATIONS

Mixed concrete shall be rejected if it is not placed within 90 minutes after water is introduced into the mixture and air temperature is 80°F or less, or if it is not placed within 60 minutes after water is introduced into the mixture and air temperature is above 80°F; or if the initial set has developed.

03300.3.5 HOT OR COLD WEATHER PLACEMENT REQUIREMENTS

03300.3.5.1 TEMPERATURE LIMITATIONS - Concrete temperature shall be between 50°F and 90°F at the time of placement in the forms.

03300.3.5.2 HOT WEATHER CONDITIONS - Hot weather conditions shall be considered to exist when ambient temperatures exceed 90° F, or when the ambient temperature is below 90° F but the temperature to humidity relationships shown in the following table for conditions below 90° F exist.

TEMPERATURE/HUMIDITY RELATIONSHIP

Relative Humidity Less Than (Percent)	Air Temperature Greater Than (°F)	Maximum Concrete Temperature (°F)
80	90	90
70	90	90
60	90	90
50	90	85
40	90	80
30	80	75
20	75	70

During hot weather conditions, the Contractor shall take the following steps to protect the concrete:

- The concrete ingredients shall be cooled before mixing to maintain concrete temperature at time of placement below the maximum acceptable values listed in the table below.

Mixing water may be chilled, or chopped ice may be used to control the concrete temperature, provided the water equivalent of the ice is calculated into the total amount of mixing water. Ice shall be completely melted and dispersed throughout the mix at the completion of the mixing time.

All methods and equipment for cooling of water and aggregate shall be subject to approval of the Engineer, and shall conform to ACI 305.

- Reinforcing steel shall be covered with water-soaked burlap as required, to prevent the steel temperature from exceeding the ambient air temperature immediately before concrete placement.
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- Forms shall be thoroughly wet, but free of standing water, before concrete placement. Concrete should be placed in shallower layers than under normal weather conditions if necessary to assure coverage of the previous layer while it will respond readily to vibration.
- Fog spray shall be used during finishing whenever necessary to avoid surface plastic-shrinkage cracking. Fog spray shall also be used after finishing, before the specified curing is commenced, to avoid surface plastic-shrinkage cracking.
- Forms shall be kept covered and continuously moist. Once forms are loosened and during form removal, concrete surfaces shall be protected from drying, and shall be kept continuously wet by fog spraying or other approved means.

Additional costs due to concrete placement in hot weather conditions shall be the responsibility of the Contractor.

03300.3.5.3

COLD WEATHER CONDITIONS - Cold weather limitations shall apply when air temperature falls below 40°F. Procedures for protecting concrete shall be in accordance with ACI Standard 306, "Recommended Practice for Cold Weather Concreting." If concrete placement is necessary during low temperature conditions, the Contractor shall take the following steps to protect the concrete:

- The Contractor shall heat all water and aggregates uniformly in accordance with Section 03050 before mixing, to obtain a concrete mixture temperature between 60°F and 90°F at the time of placement.
- The Contractor shall not use calcium chloride, salt or other material containing antifreeze agents or chemical accelerators unless approved otherwise in writing by the Engineer.
- If temperatures are expected to drop below 32°F the night before the concrete is placed, all reinforcement, the forms, and the ground shall be preheated at a minimum temperature of 50°F for a minimum of 12 hours prior to placement.
- The concrete shall be protected from freezing. The Contractor shall furnish all materials and equipment to insulate and to heat the work as necessary to maintain concrete temperatures above 50°F.
- Concrete temperature shall be maintained at not less than 50°F and not more than 70°F for the first 7 days after placement.
- Combustion type heaters, which produce carbon monoxide (CO), shall be adequately vented.

The Contractor shall assume all risk in connection with placing concrete in cold weather conditions. Permission given to place concrete in cold weather shall in no way relieve the Contractor of the responsibility for compliance with these Specifications. Any work not in compliance with these Specifications due to cold weather conditions shall be removed and replaced at the Contractor's expense.

03300.3.6 JOINTS

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03300.3.6.1 COMPLIANCE - Construction joints shall be placed at the locations shown on the Drawings or as approved by the Engineer. Expansion and contraction joints and joint sealing shall be accomplished in accordance with Section 03310.

03300.3.6.2 CLEANING - Unless otherwise directed by the Engineer, all construction joints shall be cleaned prior to placement of concrete. All unsatisfactory concrete, latency material, stains, debris, and other foreign materials shall be removed. After cleaning, the surface shall be washed thoroughly to remove all loose material. Excess water shall be disposed of in such manner that it will not stain, discolor, or otherwise affect adjacent surfaces of the structures.

03300.3.7 FINISHING

Finishing shall be accomplished as indicated on the Drawings and in accordance with the requirements of Section 03100. Water shall not be sprinkled on concrete surfaces during finishing.

03300.3.8 CURING

Curing shall meet the requirements of Section 03100.

03300.3.9 PROTECTION

The Contractor shall provide necessary barriers, walkways, etc. to protect freshly placed concrete from physical damage. Any damage sustained as a result of failure to provide such protection shall be corrected at the Contractor's expense.

03300.3.10 REPAIR OF DEFECTIVE CONCRETE

03300.3.10.1 REPAIR FOR NON-COMPLIANCE - All concrete that fails to conform to required material characteristics, dimensions, lines, finishes and elevations shown on the Drawings, or in accordance with these Specifications shall be replaced or corrected in accordance with these Specifications and as approved by the Engineer.

03300.3.10.2 ADDITIONAL TESTING - Any engineering analysis and additional testing required to determine the extent of repair will be provided by the Contractor at no additional cost to the Owner.

03300.3.10.3 REMOVAL OF SLABS WITH CRACKS - Removal of concrete sections with cracks in slabs which occur within 2 feet of expansion or construction joints may be deemed necessary by the Engineer.

03300.3.11 QUALITY COMPLIANCE

Concrete work may be rejected for failure to comply with the following requirements:

03300.3.11.1 SPECIFICATION NON-COMPLIANCE - Concrete work shall be rejected if the materials used in the work fail to comply with the requirements of Section 03050 and 03200.

03300.3.11.2 STRENGTH TEST FAILURE - Concrete work, for which the average of three 28-day compressive or flexural strength samples made from the same batch falls below the acceptance level, shall be rejected, unless otherwise directed by the Engineer.

03300.3.11.3 IMPROPER CURING - Concrete work for which the method of curing is not as specified, or that has been inadequately protected from extremes of temperature during the early stages of hardening and strength development, shall be rejected, unless otherwise directed by the Engineer.

03300.3.11.4 ACCIDENT AND INJURY - Concrete work that has been subjected to construction fires, accidents, mechanical injury or premature removal of formwork likely to result in deficient strength development, shall be rejected, unless otherwise directed by the Engineer.

03300.3.11.5 POOR WORKMANSHIP - Concrete work, subjected to poor workmanship that may result in deficient strength or load carrying capacity, including but not limited to honey combing, cold joints, introduction of contaminants or embedded debris, improper placement location or dimensions, and etc., shall be rejected, unless otherwise directed by the Engineer.

03300.3.11.6 POOR FINISH - Concrete work that fails to meet the required finish in accordance with the requirements of Section 03100, or exposed concrete with defects adversely affecting the appearance of the specified finish shall be rejected, unless otherwise directed by the Engineer.

03300.4 METHOD OF MEASUREMENT

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03300.4.1 NO MEASUREMENT

When concrete is not indicated as a separate item in the Bid Schedule, no measurement will be made and the concrete required for a structure shall be considered a component of another item or items shown in the Bid Schedule.

03300.4.1 SEPARATE MEASUREMENT

03300.4.1.1 CUBIC YARD - When concrete is indicated as a separate item on the Bid Schedule, measurement shall be made by counting the number of cubic yards placed and accepted as determined by calculating volumes using the dimensions shown on the Drawings. This measurement shall NOT include:

- Any allowance for reinforcing steel in concrete.
- Any allowance for concrete required for filling over-excavation for footings, walls or slabs.
- Any allowance for volume occupied by pipes (except culverts), reinforcing steel, anchors, conduits, or weep holes.

03300.4.1.2 SQUARE UNIT - Measurement for square feet or yards of concrete shall be made using an accurate measuring device to determine the length and breadth of concrete placed and accepted and then multiplying those values to find the amount of area covered.

03300.5 BASIS OF PAYMENT

The accepted quantities shall be paid for at the contract unit price:

PAY ITEM	UNIT
Concrete (Class _____)	Cubic Yard
Concrete (Class _____)	Square Yard
Concrete (Class _____)	Square Foot
Concrete Structure (Name)	Lump Sum

- 03310.1 DESCRIPTION
- Furnish materials and install appropriate longitudinal and transverse expansion joints, construction joints and crack control joints in slabs and pavement.
- 03310.1.1 RELATED WORK ENT 102458:2000 PG 317 of 480
- Section 03050 - Portland Cement Concrete
Section 03100 - Concrete Forming, Finishing, and Curing
Section 03300 - Concrete Structures and Slabwork
- 03310.1.2 SUBMITTALS
- The Contractor shall submit the following to the Engineer for review and approval:
- 03310.1.2.1 PRODUCT CERTIFICATION - The manufacturer's certification that product was manufactured, tested and supplied in accordance with source control requirements specified herein, together with a report of the test results and the date each test was completed.
- 03310.1.2.2 INSTRUCTIONS - The manufacturer's instructions for joint preparation, type of cleaning and installation.
- 03310.1.2.3 DATA SHEETS - The manufacturer's product and safety data for each joint sealant product required.
- 03310.1.2.4 SAMPLES - A manufacturer's sample of each joint sealant product required.
- 03310.1.3 DEFINITIONS
- Not used.
- 03310.2 MATERIALS
- 03310.2.1 GENERAL
- 03310.2.1.1 COMPABILITY OF MATERIALS - Provide joint filler, sealant backings, sealants and other related materials that are compatible with one another and with joint substrates under conditions of service and application, as demonstrated by sealant manufacturer based on testing and field experience.
- 03310.2.1.2 DELIVERY OF MATERIALS - Deliver materials to site in original unopened containers or bundles with labels identifying manufacturer, product name and designation, color, expiration period for use, pot life, cure time and mixing instructions for multi-component materials.
- 03310.2.1.3 STORAGE AND HANDLING OF MATERIALS - Store and handle materials in compliance with manufacturer's recommendations to prevent deterioration; or damage due to moisture, high or low temperatures, contaminants or other causes.
- 03310.2.2 PRODUCTS
- 03310.2.2.1 JOINT VOID FORMER - Shall be of plastic with a waterstop and shall extend 1/3 of the depth of the concrete structural section.

3310.2.2.2

JOINT FILLER - J4 joint filler shall be the required standard and shall be used unless another filler from the list below is specified. Fillers shall be non-extruding, resilient, and meet the requirements of ASTM D-545:

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- F1 Joint Filler - 13mm thick filler for expansion joints; bituminous (asphalt or tar) mastic in accordance with ASTM D-994; formed and encased between 3 layers of bituminous saturated felt or 2 layers of glass fiber felt.
- F2 Joint Filler - Cane or other cellulosic fiber in accordance with ASTM D-1751, saturated with asphalt.
- F3 Joint Filler - Granulated cork in accordance with ASTM D-1751; in an asphalt binder; encased between 2 layers of asphalt saturated felt or 2 layers of glass fiber felt.
- F4 Joint Filler - Sponge rubber fully compressible in accordance with ASTM C-1752, with resiliency recovery rate of 90 percent minimum.
- F5 Joint Filler - Cork in accordance with ASTM C-1752; impregnated and bound with asphalt; compressible with resiliency recovery rate of 90 percent if not compressed more than 50 percent of original thickness.
- F6 Joint Filler - Plastic foam (for cold-applied sealants only) pre-formed, compressible, resilient, non-waxing, non-extruding strips of flexible, non-gassing plastic foam; non-absorbent to water and gas; 20 lb/ft³ density maximum; and of size and shape to control sealant depth and performance.
- Synthetic Sponge Rubber Filler - Synthetic sponge rubber filler shall be an expanded closed cell sponge rubber, manufactured from a synthetic polymer neoprene base. The material shall be No. 750.3.Ropax Rod Stock as manufactured by the Presstite Division of Interchemical Corporation; Bondtex as manufactured by Rubatex Corporation; or approved equal. The size of the material shall be 25 percent greater in diameter than the nominal joint width. The manufacturer's instructions for surface preparation and application shall be used as a guide for installation, except that the material shall not be installed by stretching beyond its normal length.

03310.2.2.3

SEALANT - Hot applied joint sealant shall be one of the following:

- HAS1 Sealant - Resilient and adhesive compound type in accordance with ASTM D-3405, for Portland cement concrete or asphalt concrete pavements.
- HAS2 Sealant - Thermoplastic type in accordance with ASTM D-3581, jet fuel resistant without rubber, unless indicated otherwise.
- HAS3 Sealant - Elastomeric type in accordance with ASTM D-1190.
- HAS4 Sealant - Elastomeric type in accordance with ASTM D-3406, one component, for Portland cement concrete pavements.
- HAS5 Sealant - Elastomeric type in accordance with ASTM D-3569, one component, jet-fuel resistant, for Portland cement concrete pavements.

Cold applied joint sealant shall be one of the following:

- CAS1 Sealant - Elastomeric type in accordance with ASTM C-920; chemically curing, for vehicular or pedestrian use and types of construction other than highway and airfield pavements and bridges and joint substrates indicated; Type S or M; Grade P or NS; Class 25; Use T, NT, M and O with the following characteristics:
 - ⇒ Self leveling
 - ⇒ 40 ± 5 ASTM D-2240 Shore A Hardness
 - ⇒ 4 days minimum final cure
 - ⇒ 10 to $+150^{\circ}$ F service range
- CAS2 Sealant - Mastic type in accordance with ASTM D-1850, single or multiple companion, for joints having a minimum width of 1/2 inch.
- CAS3 Sealant - Coal tar modified urethane type in accordance with FS SS-S-200; one part, jet fuel resistant; Type H.
- CAS4 Sealant - Elastomeric, pre-formed polychloroprene type with lubricant adhesive and indicated movement ratio which meets one of the following:
 - ⇒ For concrete pavement seal; ASTM D-2628
 - ⇒ For concrete bridge seal; ASTM D-3542

Synthetic rubber sealant shall be as follows:

- The sealant shall be a 3-part polyurethane compound.
- Sealant shall be designed to cure at room temperature to a firm, highly resilient rubber.
- Sealant shall have the following properties determined at conditions of 75° F and 50 percent relative humidity:
 - ⇒ Base - polyurethane rubber
 - ⇒ Solids - not less than 97 percent
 - ⇒ Application time - not less than 3 hours
 - ⇒ Cure time - not more than 5 days
 - ⇒ Ultimate hardness - 35 ± 5 (Shore A Durometer)
 - ⇒ Tensile strength (ASTM D412) - 300 pounds per square inch minimum
 - ⇒ Ultimate elongation - not less than 300 percent
 - ⇒ Color - gray to match concrete unless otherwise indicated
- All packages shall be code dated. No material shall be more than 6 months old when used. Material shall have been kept at temperatures lower than 80° F at all times.

03310.2.2.4

BACKER ROD - Backer rod shall be neoprene, butyl, EPDM, or silicone tubing complying with ASTM D-1056, water and gasoline non-absorbent, capable of remaining resilient at temperatures down to -26° F. Provide product with low compression set and of size and shape to provide a secondary seal, to control sealant depth, and otherwise contribute to optimum sealant performance.

- 03310.2.2.5 BOND BREAKER TAPE – Bond breaker tape shall be self-adhesive polyethylene or other plastic tape as recommended by sealant manufacturer for preventing sealant from adhering to joint filler materials or joint surfaces at back or bottom of joint.
- 03310.2.2.6 WATERSTOPS - Waterstop shall be rubber waterstop or PVC waterstop as designated on the Plans or in the Special Provisions and shall meet the requirements described herein.

- Waterstops shall be as manufactured by Burke Concrete Accessories Inc., Kirkhill Rubber Company, Williams Products Inc., Greenstreak, or approved equal:
- Waterstop shall be of the width and cross-section configuration shown on the Drawings or required in the Special Provisions.
- At expansion joints, only hollow centerbulb type waterstop shall be used.

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Rubber waterstop shall meet the following requirements and conditions:

- Waterstop shall be manufactured to ensure an integral cross section which will be dense, homogeneous, and free from porosity and other imperfections.
- Minor surface defects, such as surface peel, covering less than 1 square inch and surface cavities or bumps less than 1/4" in longest lateral dimension and less than 1/16" deep, will be acceptable.
- The rubber waterstop shall meet the following Specifications:
 - ⇒ Hardness-Shore A Durometer – 60 to 70, ASTM D 2240
 - ⇒ Elongation - not less than 450%
 - ⇒ Tensile Strength - not less than 3,000 psi
 - ⇒ Tensile Strength after aging 48 hours in oxygen at 70°C and 300 psi - not less than 80% of original
 - ⇒ 300% Modulus - not less than 900 psi
 - ⇒ Water absorption after 2 days at 158°F – not more than 5%
 - ⇒ Compression set after 22 hours at 158°F - not more than 30%
 - ⇒ Specific Gravity - 1.17 ± .03

Polyvinylchloride (PVC) waterstop shall be as manufactured by Greenstreak, or approved equal, and shall meet the following requirements and standards:

<u>Property</u>	<u>ASTM Test</u>	<u>Nominal Value</u>
⇒ Water absorption	D 570	0.15
⇒ Tear resistance	D 624	350/lb.in.
⇒ Ultimate elongation	D 638	390%
⇒ Tensile strength	D 638	2250 psi min.
⇒ Low temperature brittleness	D 746	+35°F/+37°C (passed at)
⇒ Stiffness in flexure	D 747	1190 psi
⇒ Specific gravity	D 792	1.37
⇒ Ozone resistance	D 1149	No failure
⇒ Volatile loss	D 1203	0.30%
⇒ Hardness (Shore A15)	D 2240	76+3
⇒ Accelerated Extraction		
Tensile strength		2130 psi
Elongation		370%

PVC waterstop shall be heat weldable, have great inherent elasticity, be impervious to many waterborne chemicals, be suitable for above or below grade installation, not produce electrolytic reactions, and not discolor concrete or mortar.

See Subsection 03310.3.10 for waterstop installation specifications.

03310.3 CONSTRUCTION REQUIREMENTS

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03310.3.1 WEATHER CONDITIONS

Do not proceed with installation of joint sealant under unfavorable weather conditions. Install elastomeric sealant only when temperature is stable within the temperature range recommended by manufacturer for installation.

03310.3.2 PREPARATION

03310.3.2.1 JOINT CLEANING - Clean, prepare and size joints in accordance with manufacturer's instructions. Remove any loose materials and other foreign matter. Do not proceed with installation of joint sealant until contaminants capable of interfering with sealant adhesive properties are removed from joint substrates. Remove any moisture on the substrate.

Remove protective coating and any oil from metals with solvent recommended by the sealant manufacturer.

03310.3.2.2 JOINT DIMENSIONS - Examine joint dimensions and size materials to achieve required width to depth ratio. Adjust joint depths to allow sealant to perform properly.

03310.3.2.3 MATERIAL COMPATIBILITY - Verify that joint shaping materials and release tapes are compatible with sealant.

03310.3.3 CONSTRUCTION

03310.3.3.1 FEATURES AND PURPOSES OF JOINT CONSTRUCTION - Construct all joints as follows:

- At right angles to top surface of placement.
- Straight unless indicated otherwise.
- Before uncontrolled shrinkage cracking takes place.
- To prevent concrete edge slump.

03310.3.3.2 BOND BREAKER TAPE - Install where needed or required by manufacturer's recommendations to ensure that elastomeric sealant will perform properly.

03310.3.3.3 EXPANSION JOINTS - Expansion joints shall be constructed as follows:

- They shall be placed in locations as shown on the Drawings or as approved by the Engineer.
- Joints in exterior concrete slab work shall be placed where shown on Drawings or as recommended by Portland Cement Association's "Design and Control of Concrete Mixture Manual".

- Pre-molded filler strips shall extend full depth in slab.
- Unless otherwise noted on the Drawings or directed by the Engineer, isolation joints shall be used in all areas where slabs abut vertical surfaces. Joint material shall be placed as called for and in good alignment.
- In no case shall the reinforcing or other fixed metal items embedded in or bonded to concrete be made to run continuously through an expansion joint.
- Concrete edges at joints shall be neatly finished with an edging tool providing a slightly rounded edge on each side of the joint filler material.

03310.3.3.4 CONSTRUCTION JOINTS - Other references to construction joints are located in Subsection 03300.3.6.

03310.3.3.5 CONTROL JOINTS - Control joints shall be constructed as follows:

- Tooled Joints. Tooled joints shall be formed by scoring the slab full depth with a steel trowel along a straight edge in locations as shown on the Drawings or, if not shown, not to exceed 625 square feet in area. The joint shall be finished using a joint tool guided by a straight edge leaving a slightly rounded edge on each side of the joint.
- Sawn Joints. Sawn joints shall be sawn into interior concrete floors as indicated on the Drawings and at Contractor's option in place of pre-formed metal keys. Joints shall be sawn with a power saw designed to saw depth and width as shown on Drawings. Hand held saws will not be accepted. Saw cutting shall occur within 12 hours after placement of concrete. The line of the saw shall be straight, true to line and square. Pourable joint sealant shall be poured into all sawn joints. Installation shall be in strict accordance with manufacturer's specifications which shall include preparation, priming, etc.

03310.3.3.6 JOINT SEALING - Installation of joint sealant shall adhere to the following procedures:

- Manufacturer's Instructions. Application shall be in strict accordance with the manufacturer's published instructions.
- Surface Preparation. All surfaces to which synthetic rubber sealant must bond shall be dry and free of dust, dirt, and other foreign residue and shall be primed with the manufacturer's recommended primer for the particular surface. Remove all oil, grease, wax, form release agents, curing compounds, bitumen, old caulking, and other latent material by sand blast or water blast, as recommended by the sealant manufacturer. Maximum angle for sand blasting is 25 degrees \pm 5. Clean and dry with air blast. Do not contaminate air blast with oils or lubricants. Remove frost and moisture in concrete joint substrates before commencing sealing.
- Installation. If necessary, joints shall be saw cut, to provide the required sealant thickness and depth. Application shall be by means of a pneumatic caulking tool or other approved method. Ensure that sealant is installed in uniform, continuous ribbons without gaps or air pockets, with complete bonding of joint surfaces on opposite sides. Except as otherwise indicated, fill sealant rabbet flush with surface. Where horizontal joints are between a horizontal surface and vertical surface, fill joint to form a slight cove so that joint will not trap moisture and dirt.

Install sealant to depths indicated or, if not indicated, as recommended by sealant manufacturer, but within the following general limitations measured at center (thin) section of bead:

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- ⇒ For sidewalks, pavements and similar joints sealed with elastomeric sealants and subject to traffic and other abrasion and indentation exposures, fill joints to a depth equal to 75 percent of joint width, but neither more than 5/8 inch deep nor less than 3/8 inch deep.
- ⇒ For normal moving joints sealed with elastomeric sealants but not subject to traffic, fill joints to a depth equal to 50 percent of joint width, but not more than 1/2 inch deep nor less than 1/3 inch deep.
- ⇒ For joints sealed with non-elastomeric sealants and caulking compounds, fill joints to a depth in the range of 75 percent to 125 percent of joint width.

- Overflow and Spillage. Do not allow poured sealant compound to overflow or spill onto adjoining surfaces or to migrate into voids of adjoining surfaces. Clean adjoining surfaces to eliminate evidence of spillage.
- Overheating. Do not overheat hot applied sealants.
- Exposed Edges. Unless indicated otherwise, recess exposed edges of gasket and exposed joint filler slightly behind adjoining surface so compressed units will not protrude from joints.

03310.3.3.7

CURING AND PROTECTION - The Contractor shall follow the steps listed below regarding curing and protection of sealant:

- Cure sealant and caulking compounds in accordance with manufacturer's instructions and recommendations to obtain high early bond strength, internal cohesive strength and surface durability.
- Follow procedures required for cure and protection of joint sealants during construction period so they will be without deterioration or damage (other than normal wear and weathering) at time of Substantial Completion.
- Protect joint sealant during and after curing period from contact with contaminating substances, or from damage resulting from deterioration through the time of Substantial Completion.
- If damage or deterioration occurs, immediately cut out and remove damaged or deteriorated joint sealant and reseal joint with new materials. Repaired area shall be indistinguishable from un-repaired area.

0351.3.3.8

CLEANUP - Clean off all excess sealant or sealant smears adjacent to joints as the work progresses. Use methods and cleaning materials approved by manufacturers of joint sealant and of the products in which joints occur.

03310.3.4

WATERSTOPS

03310.3.4.1

INSTALLATION - Waterstops shall be installed in concrete joints where and as indicated on the Plans. Waterstops shall be set accurately to the position and line indicated on the Plans. Where required at expansion joints, the hollow, centerbulb type waterstop shall be installed centered on the joint.

03310.3.4.2 CONTINUITY - All waterstops shall be continuous. Waterstops in walls shall be carried into lower slabs and shall join the waterstops in the slabs with appropriate types of fittings. Waterstops shall be terminated 3 inches from the top of finished surfaces of walls and edges of slabs unless otherwise specified or indicated on the Plans

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03310.3.4.3 FASTENING IN PLACE - Edges shall be held and securely fixed in position at intervals of not more than 24 inches to prevent movement during the placing of the concrete. Wires placed near the outer bulb and/or special clips may be used for this purpose, at the Contractor's option. No nails shall be driven through a waterstop in the vicinity of any construction joint.

03310.3.4.4 JOINTS - Waterstop joints shall meet the following requirements

- All waterstop joints shall be watertight.
- All joints shall be made by the use of factory-made fittings and unions, some of which will be special.
- Fittings and unions shall be cemented in place using clamps over the entire area of splice until the cement is bonded permanently.
- Welding of the waterstop without the use of factory-made unions and fittings will not be permitted.
- Split type waterstop may be used, at the option of the Contractor, provided that all junctions between standard solid type waterstop and split type waterstop shall be made with solidly welded and cemented unions between the two waterstops. This union may be split and re-cemented in accordance with the manufacturer's recommended method.
- Cement shall be as recommended by the manufacturer of the waterstop, and field cementing or solvent welding shall be in accordance with the manufacturer's directions.

03310.4 METHOD OF MEASUREMENT

Unless otherwise indicated in these Specifications, no separate measurement will be made for the materials and work covered by this section.

03310.5 BASIS OF PAYMENT

Unless otherwise noted in these Specifications, no separate payment will be made for items under this section. Compensation shall be included in the prices paid for the various contract items and no separate compensation will be allowed.

03500.1 DESCRIPTION

This is a generic specification covering furnishing and installing of pre-cast concrete units complete with required accessories as shown on the Drawings and called out in these Specifications.

03500.1.1 RELATED WORK

Section 01300 - Submittals
Section 02224 - Sewer Pipe and Manholes
Section 03050 - Portland Cement Concrete

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03500.1.2 SUBMITTALS

03500.1.2.1 SHOP DRAWINGS - Submit shop drawings showing unit design, signed and sealed by a Professional Engineer, in accordance with Section 01300. The Contractor shall not proceed with fabrication until shop drawings have been approved.

03500.1.2.2 UNIT DESIGN - Unit design shall incorporate the following:

- Pre-cast units shall be designed in accordance with ACI 318 and PCA design handbooks under the direction of a Professional Engineer experienced in the design of such units.
- Indicate unit locations, unit identification marks, fabrication details, reinforcement, connection details, pertinent dimensions, and erection support points.
- Units shall be designed to support the required shipping and handling loads, and the live, dead and construction loads.
- Component connections shall be designed to provide adjustment to accommodate misalignment of structure during installation.
- The Engineer may approve design deviations provided that equivalent units serving the same basic function and intent are furnished at no additional cost to the Owner. Such deviations shall only be approved upon written request and when accompanied with complete design calculations and drawings.

03500.1.3 DEFINITIONS

Not used.

03500.2 MATERIALS

03500.2.1 ACCESSORIES

Connecting and supporting devices shall be carbon steel in accordance with ASTM A 36. Bolts, nuts and washers shall be carbon steel or stainless steel as required on the Drawings. Grade 60 reinforcement shall be provided for all units.

03500.2.2 IDENTIFICATION MARKS

Unit identification marks shall appear on all manufactured units.

03500.2.3 FINISHES

Shall be in accordance with one of the following paragraphs. If no finish is prescribed on the Drawings, the Standard Finish will be provided.

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- 03500.2.3.1 STANDARD FINISH - Produced in plastic or metal lined forms which impart a smooth finish. Small surface holes, normal form joint marks, minor chips and spalls may be approved. Major or unsightly imperfections, honeycomb or structural defects are not acceptable.
- 03500.2.3.2 COMMERCIAL FINISH - Produced in plastic or metal lined forms which impart a smooth finish. Remove fins and large projections and fill holes over 1/2 inch with sand-cement paste. Faces shall be true and well defined. Exposed ragged edges shall be corrected by rubbing or grinding.
- 03500.2.3.3 ARCHITECTURAL GRADE FINISH - Produced in plastic or metal lined forms which impart a smooth finish. Fill holes over 1/4 inch in diameter with sand-cement paste. Grind smooth form offsets or fins over 1/8 inch. Coat with neat cement paste using a float and after paste has dried, rub with burlap to remove loose particles.
- 03500.2.3.4 SPECIAL FINISHES - Finishes produced by sandblasting, acid washing, or form liners shall be specifically defined on the Drawings or in these Specifications and samples showing texture and color will be required for approval.
- 03500.2.3.5 PAINTABLE FINISHES - Where unit surfaces will be painted, only form release agents compatible with paints shall be used during fabrication.
- 03500.3 CONSTRUCTION REQUIREMENTS
- 03500.3.1 FABRICATION
- Fabrication of pre-cast units shall proceed as follows:
- 03500.3.1.1 RECORDS - Maintain plant records and quality control program during production of structural pre-cast concrete. Make records available to Engineer.
- 03500.3.1.2 MOLDS - Use molds which are rigid and constructed of material that will result in uniform finished products.
- 03500.3.1.3 PLACEMENT AND VIBRATION - Place and vibrate concrete to ensure: proper consolidation, elimination of cold joints, and minimize entrapped air marks on finished surfaces.
- 03500.3.1.4 REINFORCEMENT AND FITTINGS - Provide required connecting devices, plates, angles, and connectors to steel framing members, bolts and accessories. Ensure reinforcing steel, anchors, inserts, plates, angles and other cast-in items are sufficiently embedded, anchored and properly located.
- 03500.3.1.5 LIFTING DEVICES - Embedded lifting or handling devices shall be capable of supporting units in positions anticipated during manufacture, storage, transportation and erection.
- 03500.3.1.6 FINISHED SURFACE - Ensure finished surfaces of pre-cast structural units are uniform.
- 03500.3.1.7 CURING - Cure units under identical conditions to develop specified concrete quality and minimize appearance of blemishes such as non-uniformity, staining or surface cracking.

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03500.3.2 DELIVERY, STORAGE AND HANDLING

03500.3.2.1 DELIVERY - Unless otherwise approved in writing, do not deliver units to job site until required for installation.

03500.3.2.2 EDGE PROTECTION - Provide edges of units with adequate protection to prevent staining, chipping or spalling of concrete.

03500.3.2.3 HANDLING - Handle pre-cast units in positions consistent with their shape and design. Lift and support only from support points indicated on Shop Drawings.

03500.3.2.4 BLOCKING AND BRACING - Block and laterally brace units while in storage. Provide lateral bracing that is sufficient to prevent bowing and warping. Bracing shall be clean, non-staining and of a type that will not inhibit uniform curing of exposed surfaces.

03500.3.3 INSTALLATION

Do not install pre-cast units until concrete has attained its design compression strength. Install members plumb, level and in alignment. Clean weld marks or other marks, debris or dirt from exposed surfaces of units.

03500.3.4 REPAIR

Repair of damaged units may be acceptable if structural integrity or appearance is not impaired.

03500.4 METHOD OF MEASUREMENT

03500.4.1 NO MEASUREMENT

Separate measurement for pre-cast concrete units will not be made when the unit is a component of a building, assembly or enclosure for which identification is made in the Bid Schedule.

03500.4.2 SEPARATE MEASUREMENT

When pre-cast concrete units appear as a separate item on the Bid Schedule, they will be measured either by counting the number of units installed and accepted or by using a measuring tape or other accurate measuring device to determine the total number of lineal feet of units installed and accepted.

03500.5 BASIS OF PAYMENT

Separate payment for pre-cast concrete units will not be made when they are a component of building, assembly or enclosure identified in the Bid Schedule.

The accepted quantities will be paid for at the contract unit price for:

PAY ITEM	UNIT
Pre-Cast Concrete (<i>Describe</i>)	Each
Pre-Cast Concrete (<i>Describe</i>)	Lineal Foot

- 03600.1 DESCRIPTION ENT 102458:2000 PG 328 of 480
- This section covers furnishing materials and placing Portland cement grout, epoxy grout, and mortar for finishing concrete surfaces, leveling beds for structural steel plates, sealing joints between piping and structures, and sealing joints between construction components.
- 03600.1.1 RELATED WORK
- Section 03100 - Concrete Forming Finishing, and Curing
Section 03300 - Concrete Structures and Slabwork
Section 04100 - Brick Masonry
Section 04200 - Concrete Block Masonry
- 03600.1.2 SUBMITTALS
- Provide description of mix components, which indicates proportions to be used, environmental conditions expected and ad mixture limitations. Indicate type, grade and class of materials which suit the requirements in accordance with Section 01300. Manufacturer's data shall be provided to the Engineer for all materials.
- 03600.1.3 DEFINITIONS
- Not used
- 03600.2 MATERIALS
- 03600.2.1 PORTLAND CEMENT
- Shall meet ASTM C-150, natural color, Type II (normal) or Type IIA (air entraining).
- 03600.2.2 HYDRATED LIME
- Shall meet ASTM C-207, Type S.
- 03600.2.3 WATER
- Shall be potable, or water which meets the requirements of AASHTO T-26.
- 03600.2.4 GROUT AGGREGATE
- Shall be fine aggregate (generally masonry type sand), which meets the requirements of Section 03050 with a maximum particle size specified therein or on the DRAWINGS.
- 03600.2.5 PORTLAND CEMENT GROUT
- Shall be one part Portland Cement to one part grout aggregate proportioned by volume. Mix for 5 minutes with sufficient water to achieve the consistency of thick cream. Minimum Compressive Strength - ASTM C-109, 2800 psi in 28 days.
- 03600.2.6 SHRINKAGE RESISTANT GROUT
- Shall be a pre-mixed, non-metallic, non-corrosive, non-staining product containing selected silica sands, Portland Cement, shrinkage compensating agents, plasticizing and water reducing agents.

04100.1 DESCRIPTION

Includes furnishing materials, anchorage, accessories and labor required to construct walls and structural features of buildings.

04100.1.1 RELATED WORK

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Section 03600 - Grout and Mortar

04100.1.2 SUBMITTALS

04100.1.2.1 DRAWINGS - When called for in these Specifications, the Contractor shall furnish drawings of general construction of forms, jointing, location of ties and other items affecting visibility. Where special shapes of brick units, or pre-cast concrete units are shown on the Drawings, the Contractor shall furnish drawings and detail descriptions of these units for approval by the Engineer.

04100.1.2.2 MANUFACTURER'S INFORMATION - Submit name of manufacturer, type, size, grade and color samples of brick units for selection by the Engineer.

04100.1.3 DEFINITIONS

Facing Brick - brick specifically manufactured and finished for exposure in exterior and/or visible wall surfaces.

Building Brick - Some times referred to as "common" brick and specifically designed for use as interior units in structural wall components without exposure.

Flashing - Sheet metal or plastic placed in brick walls to deflect surface water accumulation onto or away from joints with other structural components such as roof surfaces, foundations, etc.

Weep Holes - openings fabricated into the bottom of brick walls to allow drainage of any moisture accumulation inside the wall interior.

Wall Ties - metal connectors placed strategically to connect exterior brick wall veneer sections to interior faces or other structural components.

Lintels - Steel or reinforced concrete units installed horizontally over openings in wall sections to support the brickwork places over the opening.

04100.2 MATERIALS

04100.2.1 FACING BRICK

Shall be manufactured to meet the requirements of ASTM C 216. Unless otherwise indicated on the drawings or in these Specifications, the Contractor shall provide Type FBS, Grade SW, with the color selected by the Engineer.

04100.2.2 BUILDING BRICK

Shall be manufactured to meet the requirements of ASTM C 62. Unless otherwise indicated on the drawings or in these Specifications, the Contractor shall provide Type F, Grade SW with the color selected by the Engineer.

04100.2.3 MORTAR AND GROUT

Shall meet the requirements of Section 03600.

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04100.2.4 FLASHINGS

Unless shown otherwise on the Drawings or in these Specifications, all material used for masonry flashings shall be 22 gage (minimum) galvanized steel sheet.

04100.2.5 JOINT REINFORCEMENT

Shall be truss type galvanized steel, with 3/16-inch side rods and No. 9 cross ties.

04100.2.6 WALL TIES

Shall be galvanized bent wire, 0.1875-inch (minimum), but not greater than one-half of the mortar joint thickness.

04100.2.7 REINFORCEMENT

Shall be deformed steel bars of the size shown on the Drawings meeting the requirements for reinforcement steel in Section 03200.

04100.2.8 CONTROL JOINT FILL MATERIAL

Fill material inside control joints shall be sponge rubber, 3/8-inch thick.

04100.2.9 WEEP HOLES

Shall be formed with 5/16-inch (minimum) PVC tubing between brick units on the bottom course.

04100.3 CONSTRUCTION

04100.3.1 MORTAR

With the exception of lime putty, all mortar shall be mixed on the job, and no mixing off the job, either complete or in part, will be allowed. Materials for the mortar mix shall be measured by volume. Mortar shall be mixed in a mechanical mixer and only in such quantities as are needed for immediate use. Mortar shall be mixed for at least five minutes after all materials have been added to the mixer. No mortar which has been mixed for more than one hour shall be used.

04100.3.2 HANDLING AND STORAGE OF MASONRY UNITS

All masonry units shall be transported and handled in such manner as to prevent chipping and breakage. Storage piles, stacks, or bins shall be located to protect materials from heavy traffic. Chipped, cracked, or otherwise defective units shall not be laid in the wall where exposed to view.

04100.3.3 LAYING

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04100.3.3.1 PREPARATION—Preparations for laying shall include the following:

- The foundation on which a masonry wall is to be built shall have a clean surface. Sandblasting shall be done if there is latent foreign material lodged in the pores of the foundation surface.
- All sills, ledges, offsets and other projections shall be protected from spills or drops of mortar, and all construction by other trades shall be protected from damage which may result from the masonry work.
- Masonry units shall be cured and dried before being used. The surface of all brick shall be clean and free of dust, dirt or other foreign material before laying.
- Depending on the weather and other conditions, the Contractor may be instructed to lay brick masonry units up either wet or dry. Instructions in this regard will be included in the Special Provisions or will be given directly by the Engineer. When instructed to lay the masonry units up wet, at the time of laying all brick shall have been dampened until it reaches an absorption rate of not over 1.4-ounces per minute as determined in accordance with ASTM C-67.
- Before starting work, the mason shall measure the foundation wall and determine the joint.

04100.3.3.2 CONSTRUCTION TOLERANCES - All masonry walls shall be laid in uniform and true courses, level and plumb. Walls shall be plumb within plus or minus ¼-inch per 12 feet. Walls shall be straight horizontally within plus or minus ¼-inch in 50 feet. Wall thickness shall be as shown on the Plans with a tolerance of plus ¼-inch, minus 1/8-inch. Variation from level coursing shall not exceed ¼-inch in 10 feet.

04100.3.3.3 BOND PATTERN - Bond pattern for all masonry walls shall be running bond unless otherwise indicated on the Plans or specified herein. No jumping of bond will be allowed. Bond shall be plumb throughout.

04100.3.3.4 APPLICATION OF MORTAR – Mortar shall be applied as follows:

- Mortar joints shall be straight, cleaned and uniform in thickness and shall be tooled as indicated on the Drawings and/or as herein specified.
- Joint thickness is to be ½-inch both vertical and horizontal, unless otherwise shown.
- Full mortar bedding shall be used for the first course on the foundation. Full mortar coverage shall be provided on the face.
- Vertical head joints shall be well buttered and these joints shall be shoved tightly so that the mortar bonds well to both units.

04100.3.3.5 PLACEMENT OF MASONRY – Masonry units shall be placed as follows:

- Masonry units shall be laid in the wall to the desired height with joints of uniform thickness.
- Units shall be leveled, plumbed and straightened before the mortar has stiffened.

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- Masonry units shall be adjusted to their final position in the wall while the mortar is still soft and plastic enough to ensure a good bond.
- If the position of the unit is shifted after the mortar has stiffened, or bond is broken or cracks are formed, the unit shall be relaid in new mortar.
- Where fresh masonry joins totally or partially set masonry, the set masonry shall be cleaned before layering new work.

04100.3.3.6 CONSTRUCTING AND GROUTING VERTICAL CELLS – This work shall proceed as follows:

- All masonry shall be laid to preserve the unobstructed vertical continuity of cells to be filled with reinforcement and grout.
- Vertical cells to be filled shall have vertical alignment sufficient to maintain a clear, unobstructed continuous vertical cell measuring not less than 2 inches by 3 inches.
- Walls and cross webs forming such cells to be filled shall be full bedded in mortar to prevent leakage of grout. All head (or end) joints shall be solidly filled with mortar for a distance in from the face of the wall or unit not less than the thickness of the longitudinal face shells.
- Vertical reinforcement shall be held in position at the top and bottom and at intervals not exceeding 192 diameters of the reinforcement.
- All vertical cells containing reinforcement shall be filled solidly with grout in lifts not exceeding 4 feet in height.
- When the grouting is to be stopped for one hour or longer, horizontal construction joints shall be formed by stopping the pour of grout 1½" below the top of the uppermost unit.

04100.3.4 BEAMS AND BEARING PLATES

Two courses of grouted hollow masonry shall be provided below all steel bearing plates or beams bearing on masonry walls. Place external bearings on each side of contact with load as required to properly transfer load to the masonry wall, as indicated on the plans.

04100.3.5 OPENINGS

04100.3.5.1 METAL DOORFRAMES - Jambs and heads of metal doorframes connected to masonry shall be anchored and fully grouted. Filling of frames shall be done as each two feet of masonry is laid.

04100.3.5.2 CUTOUTS - All necessary cutting of masonry units to form chases, etc., for anchorage or other appurtenances shall be required. All cutting and fitting of exposed masonry units shall be done with a power driven carborundum or diamond disc blade saw.

Where masonry is to enclose conduits, pipes, stacks, ducts, and similar items, slots, chases, cavities, and similar spaces shall be constructed as required, whether indicated on the plans or not. No such work shall be covered until advised that work has been inspected and tested.

All openings in exterior masonry for pipes, conduits, etc., shall be caulked weather tight with silicone rubber caulking colored to match the mortar.

04100.3.6 COMPLETION AND CLEANUP

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At the completion of the work, all holes or defective mortar joints on exposed masonry shall be pointed. Where necessary, defective joints shall be cut out and re-pointed. After completion of the masonry work, all mortar drippings and other foreign substances shall be removed with a stiff brush. All exposed block surfaces shall be thoroughly wetted with clean water and then be uniformly and thoroughly washed down with a solution of one part commercial muriatic acid mixed with 8 to 10 parts of clean water. The surface shall be brushed with a stiff brush during the washing. The cleaned surface shall be entirely free of streaks and stains of any kind. All material liable to damage shall be protected. Brickwork shall be washed down with clean, fresh water immediately after acid cleaning.

04100.3.7 ANCHORS

Anchorage of intersecting walls, veneer, floor and roof shall be made in accordance with the Uniform Building Code.

04100.3.8 MASONRY FLASHING

Extend flashing through veneer, turn up minimum 8-inches and bed into mortar joints of masonry; seal to substrate as required. Lap end joints minimum 6-inches and seal watertight.

04100.3.9 LINTELS

Where steel or pre-cast concrete lintels are not scheduled, install reinforced unit masonry lintels over all openings as shown on the Drawings or prescribed herein. Construct or shop fabricate masonry lintels of like units, using grout, filled solidly, and reinforcing to properly span opening. Maintain minimum 8-inches bearing on each side of opening. Use reinforcing bars of one-piece lengths only. Place and consolidate grout fill without disturbing reinforcing. Allow lintel construction to reach strength before removing temporary supports.

04100.3.10 CONTROL JOINTS

04100.3.10.1 LOCATION - Control joints with filler shall be located as shown on the Plans or as otherwise specified. Control joints, as detailed, shall be provided at all vertical masonry walls where such walls exceed 40 feet in length. In long lengths of walls, joints shall be provided at least every 30 feet or as indicated on the Plans.

04100.3.10.2 INSTALLATION - Control joints shall be continuous full height of walls. At bond beams, control joints shall separate masonry and grout and horizontal joint reinforcement shall not be continuous. Do not continue horizontal joint reinforcing across control joints.

104100.3.10.3 FILL - Install resilient control joint in continuous lengths. Heat or solvent weld butt and corner joints in accordance with manufacturer's instructions. Fill material shall be held back from finished surface and the remainder of the joint shall be caulked with silicone rubber compound with a color which matches the mortar.

04100.3.11 ACCESSORIES

All items as required and/or directed, including all anchors, flashings, sleeves, frames, structural steel, anchor bolts, miscellaneous iron and all other items required shall be set tight and caulked as necessary to seal any exterior joints or contact surfaces. Do not build in organic materials.

04100.3.12 CUTTING AND FITTING

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Modify completed work for chases, pipes, conduit, sleeves, grounds and other items as required. Obtain approval prior to modifying any area not indicated or where appearance or strength of masonry work may be impaired. Cooperate with other sections of work to provide correct size, shape and location.

04100.3.13 PATCHING

Patching of exposed masonry units shall be done at the conclusion of the general work and shall be done in such a manner that the patching will be indistinguishable from similar surroundings or adjoining work.

04100.3.14 PROTECTION OF MASONRY WORK

Temporary protection shall be provided for all exposed masonry corners subject to injury. Masonry shall be protected against rapid drying by frequently fogging and sprinkling the work sufficiently that walls will be visibly wet for a period of not less than 3 days.

04100.3.15 COLD WEATHER CONSTRUCTION

Masonry work shall be allowed to proceed in cold weather only when air temperature is maintained at 40° or greater and the following temperatures in masonry components are attained. Heat the mixing water and aggregate to a minimum of 70°F and not over 160°F. The temperature of masonry units shall be at least 35°F when laid. Provide sufficient measures to maintain masonry temperature above 40°F for 24-hours after laying.

04100.3.16 INSULATING FILL IN WALLS

Exterior walls of all buildings which have brick cells that are not filled with grout shall be filled with insulation. Insulation shall be foamed-in-place insulation as specified in Division 7. The cells in the brick wall shall be kept as free of mortar as possible as the masonry goes up. The brick laying shall not be carried more than four feet vertically ahead of the insulation fill. That is, the insulation shall be foamed in place in lifts not to exceed four feet. Care shall be taken that no insulating fill gets into cells which are to be filled with grout and that no grout gets into cells that are to be filled with insulation.

04100.4 METHOD OF MEASUREMENT

Unless provided otherwise in Special Provisions, brick masonry will be measured as part of the building or structure listed in the Bid Schedule and no separate measurement will be made for brick masonry.

04100.5 BASIS OF PAYMENT

Separate payment will not be made for brick masonry unless provided otherwise in the Special Provisions.

04200.1 DESCRIPTION

This section covers furnishing materials, fasteners, and anchoring devices, accessories, and the labor required to construct masonry walls and other masonry structural features of buildings.

04200.1.1 RELATED WORK

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Section 03600 - Grout and Mortar
Section 03200 - Concrete Reinforcement

04200.1.2 SUBMITTALS

04200.1.2.1 DRAWINGS - When called for in these Specifications, the Contractor shall furnish drawings of general construction of forms, jointing, location of ties, and other items affecting visibility. Where special shapes of concrete units are shown on the Drawings, the Contractor shall furnish drawings and detailed descriptions of these units for approval by the Engineer.

04200.1.2.2 MANUFACTURER'S INFORMATION - Submit name of manufacturer, type, size, and grade along with color samples of block units for selection by the Engineer.

04200.1.3 DEFINITIONS

Flashing - sheet metal or plastic placed in brick walls to deflect surface water accumulation onto or away from joints with other structural components such as roof surfaces, foundations, etc.

Wall Ties - metal connectors placed strategically to connect exterior wall veneer sections to interior faces or other structural components.

Lintels - steel or reinforced concrete units installed horizontally over openings in wall sections to support masonry units placed over the opening.

Wythe - a single width of masonry wall units.

04200.2 MATERIALS

04200.2.1 CONCRETE BLOCK UNITS

Shall be hollow, lightweight, Grade N, Type I units meeting the requirements of ASTM C 90.

04200.2.2 MORTAR AND GROUT

Shall meet the requirements of Section 03600. When block opening sizes will allow adequate clearance, aggregate particle size in grout used for bond beams and vertical reinforcement may be increased to 1/2-inch (maximum).

04200.2.3 FLASHINGS

Unless otherwise shown on the Drawings or described in these Specifications, all material used for masonry flashings shall be 22 gauge (minimum) galvanized sheet steel.

04200.2.4 JOINT REINFORCEMENT

Shall be truss type galvanized steel, with 3/16-inch side rods and No. 9 cross ties.

04200.2.5 WALL TIES

Shall be galvanized bent wire, 0.1875-inch (minimum), but not greater than one-half of the mortar joint thickness.

04200.2.6 REINFORCEMENT

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Shall be of deformed steel bars of the size shown on the Drawings, meeting the requirements for reinforcement steel in Section 03200.

04200.2.7 CONTROL JOINT FILL MATERIAL

Fill material shall be fully compressible 3/8-inch thick sponge rubber, meeting the requirements of LAW ASTM D-1782, with a minimum resiliency recovery rate of 90% or better, or approved equal.

04200.2.8 SEALER

Shall be a penetrating sealer, such as Pre-Prime 167 manufactured by Devco Coatings or approved equal.

04200.3 CONSTRUCTION

04200.3.1 MORTAR

All mortar shall be mixed on the job and, with the exception of putty, no mixing off the job, either complete or in part, will be allowed. Materials for mortar shall be measured by volume. Mortar shall be mixed in a mechanical mixer and only in such quantities as are needed for immediate use. Mortar shall be mixed for five minutes after all materials have been placed in the mixer. No mortar which has been mixed for more than one hour shall be used.

04200.3.2 HANDLING AND STORAGE OF MASONRY UNITS

All masonry units shall be transported and handled in such manner as to prevent chipping and breakage. Storage piles, stacks, or bins shall be placed in locations materials will be protected from damage. Chipped, cracked, or otherwise defective units shall not be laid in the wall where defects may be exposed to view.

04200.3.3 LAYING UP

04200.3.3.1 PREPARATION - Preparation for laying up the masonry work shall proceed as follows:

- The foundation surface on which a masonry wall is to be built shall be clean. When residual material, such as dust, dirt, chips, concrete splatter, etc., is found to be present on the top surface of the foundation wall, the Contractor shall take appropriate measures as deemed necessary by the Engineer to remove such material before starting any masonry course.
- All sills, ledges, offsets and other projections shall be protected from spills or drops of mortar, and all construction by other trades shall be protected from damage which may result from the masonry work.

- Masonry units shall be cured and dried before being used and surface shall be clean and free from dust, dirt, or other foreign matter when laid in the wall. Masonry units shall not be wetted before being used but shall be laid dry.

04200.3.3.2 CONSTRUCTION TOLERANCES - All masonry walls shall be laid in uniform and true courses that are level and plumb. Walls should be plumb to within plus or minus 1/2-inch per 20 feet. Walls shall be straight horizontally to within plus or minus 1/4-inch in 50 feet. Wall thickness shall be as shown on the Drawings with a tolerance of 1/4-inch.

04200.3.3.3 BOND PATTERN - Bond pattern for all masonry walls shall be running bond unless otherwise indicated on the Drawings. No jumping of bond will be allowed. Bond shall be plumb throughout.

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04200.3.3.4 APPLICATION OF MORTAR - Mortar shall be applied as follows:

- Full mortar bedding shall be used for the first course on the foundation.
- Joint thickness is to be 1/2 inch both vertically and horizontally unless otherwise shown.
- Full mortar coverage shall be provided on all face shells and on the webs surrounding cells to be filled.
- Vertical head joints shall be well buttered for a thickness equal to the face shell, and these joints shall be shoved together tightly so that the mortar bonds well to both units.
- Joints shall be solidly filled from the face of the units to the depth of the face shell.
- Mortar joints shall be straight, clean and uniform in thickness and shall be tooled concave unless indicated otherwise on the Drawings. However, when walls are to be coated with bitumen damp proofing, mortar joints shall be struck flush with masonry unit faces.

04200.3.3.5 PLACEMENT OF MASONRY - Masonry units shall be placed as follows:

- Before starting the actual lay-up work, masonry shall be laid dry on the foundation wall and bond adjusted to openings, angles and corners.
- No units smaller than 1/2 block shall be used.
- Masonry units shall be laid in the wall to the desired height with joints of uniform thickness.
- Masonry units shall be adjusted to their final position in the wall, level, plumb, and straight, while the mortar is still soft and plastic enough to ensure a good bond.
- If the position of a unit is shifted after the mortar has stiffened, or the bond is broken or cracks are formed, the unit shall be re-laid in fresh mortar.
- If work has been stopped long enough for mortar to set, both masonry and mortar shall be cleaned before new work is laid up.

04200.3.3.6 CONSTRUCTING AND GROUTING VERTICAL CELLS - This work shall proceed as follows:

- All masonry shall be laid so as to preserve a clear, unobstructed, vertical continuity of the cells to be filled with grout.

- The vertical opening shall measure not less than 2 inches by 3 inches.
 - Walls and cross webs forming such cells shall be fully bedded in mortar, to prevent leakage of grout. See also subsection 04200.3.10 below. All head (or end) joints shall be solidly filled with mortar for a distance in from the face of the wall or unit not less than the thickness of the longitudinal face shells.
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- Vertical reinforcement shall be held in position at the top and bottom and at intervals not exceeding 192 diameters of the reinforcement material.
 - All vertical cells containing reinforcement shall be filled solidly with grout in individual lifts not to exceed 4 feet in height each.
 - Place and consolidate grout fill without disturbing reinforcing. Grout lifts greater than 8-inches shall be mechanically vibrated. Do not consolidate by shaking the vertical bars.
 - Whenever grouting is to be stopped for one hour or longer, horizontal construction joints shall be formed by stopping the pour of grout 1½" below the top of the uppermost unit.

04200.3.3.7 BEAMS AND BEARING PLATES - Two courses of grouted hollow masonry shall be provided below all steel bearing plates or beams bearing on masonry walls. At bearing points fill masonry cores with grout a minimum of 24-inches wide from bearing point to lower support member or bond beam. Place external bearings on each side of contact with load as required to properly transfer load to the masonry wall, as indicated on the plans.

Use "H" blocks for bond beams. Reinforce bond beams and pilasters as indicated on the Drawings.

04200.3.4 OPENINGS

04200.3.4.1 METAL DOORFRAMES - Jambs and heads of metal doorframes to be connected to masonry shall be anchored and fully grouted. Filling of doorframes with grout shall be done as each two vertical feet of masonry are laid. Bed anchors of metal doors and glazed frames in mortar joints. Fill frame voids solid with mortar. Fill masonry cores with grout for one core from framed openings.

04200.3.4.2 CUTOUTS - All necessary cutting of masonry units to form chases, etc., for anchorage or other appurtenances shall be part of the Contractor's required work.

- All cutting and fitting of exposed masonry units shall be done with a power driven carborundum or diamond disc blade saw.
- Where masonry is to enclose conduits, pipes, stacks, ducts, and similar items, the necessary slots, chases, cavities, and similar spaces for these items shall be constructed as required, whether indicated on the plans or not.
- The Contractor shall not cover such work until he has been informed that the work has been inspected and tested.
- All openings in exterior masonry around pipes, conduits, etc., shall be caulked weather tight with a silicone rubber product or compound designed for this purpose.

04200.3.5

LINTELS

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Where steel or pre-cast concrete lintels are not scheduled, install reinforced masonry unit lintels over openings. Construct or shop-fabricate lintels using grout fill and reinforcing. Maintain 8 inches minimum bearing on each side of opening. Door, window, and similar openings in masonry walls, unless indicated or specified otherwise, shall have lintels made up of like material "U" block units reinforced and filled solidly with grout to properly span openings. Do not splice reinforcing bars in lintels. Allow lintels to reach full strength before removing temporary supports.

04200.3.5

REINFORCING

Reinforce as indicated. Lap splices at least 40 bar diameters.

04200.3.6

ANCHORS AND BRACING

Supply metal anchors as shown on the Drawings for anchoring the masonry work to other structural members. Provide temporary dry bracing required during erection of masonry work. Maintain in place until building structure provides permanent bracing.

04200.3.7

MASONRY FLASHINGS

Extend flashing through veneer, turn up a minimum of 8 inches, and bed into mortar joints of masonry or seal substrate as required. Lap end joints 8 inches minimum and seal watertight. Use the flashing manufacturer's recommended sealant.

04200.3.8

CONTROL JOINTS

Control joints, with filler, shall be as shown on the Drawings or as specified herein.

04200.3.8.2

LOCATION - Control joints shall be provided for all vertical masonry walls where such walls exceed 40 feet in length. In longer lengths of walls, joints shall be provided at least every 30 feet or as indicated on the plans. Control joints shall be continuous for the full height of walls.

04200.3.8.3

FORMING - Form control joints by using a sheet, building paper type bond breaker fitted to the hollow contour of the block unit end. Fill the void so created with grout. Rake the joint at the exposed faces of rod and sealant.

04200.3.8.4

REINFORCING - Horizontal joint reinforcing shall not cross control joints. However, at bond beams, control joints shall separate masonry and grout; and steel reinforcing shall be continuous.

04200.3.8.5

FILLER - Control joint fillers shall be installed in continuous lengths in accordance with the manufacturer's instructions. Fill materials shall be held below the finished surface, and the remainder of the joint shall be caulked with synthetic rubber.

04200.3.8

ACCESSORIES

Furnish and install steel or pre-cast concrete components as shown on the Drawings.

Set metal door frames, fabricated metal frames, window frames, wood nailing strips, anchor bolts, plates and other items tight and caulk exterior joints with silicone rubber composition colored to match color of mortar. Place all anchor bolts in solid grouted cores. Build items plumb and level.

04200.3.9 **COMPLETION, CLEANUP AND SEALING**

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04200.3.9.1 **DEFECTIVE WORK** - At the completion of the work, all defective mortar joints on exposed masonry shall be re-pointed. Where necessary, defective joints shall be cut out and re-pointed.

04200.3.9.2 **CLEANING** - Brush off excess mortar as work progresses. Dry brush at the end each day's work.

04200.3.9.3 **FINAL CLEANING** - After mortar is thoroughly set and cured and damaged surfaces are repaired, final cleaning of exposed masonry surfaces shall proceed as follows:

- Dry clean to remove large particles of mortar using wood paddles and scrapers. Use a chisel or wire brush if necessary.
- Scrub down wall with stiff fiber brush and either a solution of ½ cup of trisodium phosphate and ½ cup of household detergent dissolved in 1 gallon of water, or commercial murtatic acid mixed in 8-10 parts of clean water, or other approved masonry cleaner.
- Rinse walls by washing off cleaning solution, dirt and mortar crumbs using clean, 100 percent soluble pressurized water.

04200.3.9.4 **SEALER** - A penetrating sealer shall be applied to concrete block masonry surfaces as shown on the Drawings.

04200.3.10 **INSULATING FILL IN WALLS**

Exterior walls of all buildings having internal cells in the block and that are not filled with grout shall be filled with insulation. Insulation shall be foamed-in-place insulation as specified in Division 7. The cells in the block wall shall be kept as free of mortar as possible as the work goes up. The brick laying shall not be carried more than four feet vertically ahead of the insulation fill.

That is, the insulation shall be foamed in place in lifts not to exceed four feet. Care shall be taken that no insulating fill gets into cells which are to be filled with grout and that no grout gets into cells that are to be filled with insulation.

04200.4 **METHOD OF MEASUREMENT**

Unless provided otherwise in the Special Provisions, concrete block masonry will be measured as part of the building or structure listed in the Bid Schedule and no separate measurement will be made.

04200.5 **BASIS OF PAYMENT**

Separate payment for concrete block masonry will not be made unless indicated otherwise in the Special Provisions.

09910.1 DESCRIPTION

The Contractor shall furnish all labor, materials and equipment necessary to paint all designated components of buildings, piping and equipment in accordance with these Specifications.

09910.1.1 RELATED WORK

Not used.

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09910.1.2 SUBMITTALS

09910.1.2.1 DESCRIPTIVE LITERATURE - Descriptive literature identifying manufacturer, type, content, application recommendations, and color samples, shall be provided in accordance with Section 01300 of these Specifications.

09910.1.2.2 DATA FOR PAINT APPROVAL - Complete data on each type and kind of paint and primer shall be submitted to the Engineer for approval. Approval shall be received from the Engineer before the paint is delivered to the jobsite. This procedure must be followed whether or not the paint that the Contractor proposes to use is named in the Specifications. Approval data shall show where and for what uses each paint product is proposed. Information submitted on each proposed type and kind of paint shall include data to show that the paint meets the detailed requirements of these Specifications.

09910.1.2.3 SAMPLES - The Contractor shall prepare and submit sample colors for all items which require color selection by the Engineer. No color selection will be made until all samples of all paints have been submitted. After all samples of all paints have been submitted, the Engineer will prepare a color scheme using the submitted colors. Colors will not necessarily be standard colors with all suppliers. The manufacturer shall mix colors, to secure the desired color when it is not one of his standard colors.

09910.1.2.4 SAND BLAST PANELS - The Contractor, at the beginning of the Project, shall furnish one square foot steel panels sandblasted in accordance with the sandblasting specifications and coated with non-yellowing shellac or clear non-yellowing plastic coating. Panels shall be used as the standards for preparation of steel surfaces for the duration of the project.

09910.1.2.5 PAINT REMNANT - At the end of the project, the Contractor shall turn over to the Engineer a gallon can of each type and color of paint, primer, thinner, or other coating used in the field painting. If the manufacturer packages the material concerned in gallon cans, then it shall be delivered in unopened labeled cans as it comes from the factory. If the manufacturer does not package the material in gallon cans, and in the case of special colors, the materials shall be delivered in new gallon containers, properly closed with typed labels indicating brand, type, color, etc. The manufacturers' literature describing the materials and giving directions for their use shall be furnished in three bound copies. A typewritten inventory list shall be furnished at the time of delivery.

09910.1.3 DEFINITIONS

Submerged Surfaces - In general, items shall be treated as submerged if they are to be at any time under water or are in structures which normally contain water. Unless specified otherwise, anything below the tops of the walls of such structures shall be considered as submerged.

09910.2 MATERIALS

09910.2.1 QUALITY CONTROL

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This specification is not intended to be exclusive or limit competition, but rather to set forth the minimum standards for quality and performance. The Owner reserves the right to reject substitutions if in his opinion, the proposed substitutions will not achieve comparable equipment installation and performance standards.

09910.2.2 COLOR

The Engineer will make color selection from color samples provided by the Contractor.

09910.2.3 PAINT SELECTION

All paint and coating systems shall include high quality materials, resistant to temperatures up to 130°F, and sunlight exposure. Paints selected shall meet the manufacturer's recommendations and suitability standards for the specific application where it will be used.

09910.2.3.1

MINIMUM REQUIREMENTS - Minimum requirements for paint materials and their application shall be as shown in the tables below:

EXTERIOR PAINT APPLICATION TABLE

Application Substrata	No. of Coats	Paint Materials and Manufacture*	Coating Thickness (Mils Per Coat)
Wood Siding, Trim, Doors	1	A-100 Exterior Alkyd Wood Primer	2.3
	2	A-100 Exterior Latex Flat House & Trim by Sherwin Williams - OR -	1.3
	1	SUPRIME 8 Exterior	1.3
	2	Pro-Hide Plus Latex Satin House by Pratt & Lambert- OR -	1.3
	1	System 2H-4 Alkyd by Tnemec	2.5
	2	Tnemec 36-603 Undercoater 2H-Color Hi-Build Tnemec Gloss	2.5
Porous Masonry (Block)	1	System 52-2 Modified Epoxy Sand Texture Finish by Tnemec	60-80
	1	52-Color Tnemec-Crete 52-Color Tnemec-Crete	8-10
Concrete Walls, Above Grade	1	Loxon Ext. Masonry Acrylic Primer	3.1
	2	A-100 Exterior Latex Satin House & Trim by Sherwin Williams -OR -	1.3
	2	Pro-Hide Plus Latex Satin House by Pratt & Lambert - OR -	1.3
	2	System 6-1 Acrylic Latex Low Sheen by Tnemec 6-Color Tnemec-Cryl	2.5
Metal (Aluminum)	2	A-100 Exterior Latex Satin House & Trim by Sherwin Williams - OR -	1.3
	1	SUPRIME 3 Latex Metal Primer	1.3

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Application Substrata	No. of Coats	Paint Materials and Manufacture*	Coating Thickness (Mils Per Coat)
	2	Pro-Hide Plus Latex Satin House by Pratt & Lambert - OR -	1.3
	1	DEFLEX 4020 Primer	3
	1	DEFLEX 4206 S/G Waterborne Acrylic Enamel by DeVoe	1.5
Metal, New Steel, (Mild Service)	1	Kem Kromik Universal Metal Primer	2.5
	2	Direct to Metal Enamel by Sherwin Williams - OR -	3.0
	1	SUPRIME 3 Latex Metal Primer	1.3
	2	Pro-Hide Plus Latex Satin House by Pratt & Lambert - OR -	1.3
	1	Devguard 4160 Primer followed by	2
	1	Devguard 4308 Alkyd Enamel or	2
	2	DEFLEX 4218 DTM Enamel by DeVoe	2
Metal, New Steel, (Severe Service)		System 66-2 Aliphatic Polyurethane by Tnemic	
	1	66-Color Hi-Build Epoxoline	4
	1	70-Color Endura-Shield	2
Metal, Galvanized Steel, (Mild Service)	1	Galvite HS	2.0
	2	A-100 Exterior Latex Satin House & Trim by Sherwin Williams -OR -	1.3
	1	SUPRIME 2 Latex Metal Primer	1.3
	2	Pro-Hide Plus Latex Satin House by Pratt & Lambert - OR -	1.3
	1	Devguard 4020 Primer	3
	2	DEFLEX 4206 S/G Waterborne Acrylic Enamel by DeVoe	1.5
Metal, Galvanized Steel, (Severe Service)		System 70-1 Aliphatic Polyurethane by Tnemic	
	1	66-Color Hi-Build Epoxoline	4
	1	70-Color Endura-Shield	2
PVC Pipe		System 66-23 Epoxy Polyamide by Tnemic	
	1	66-Color Hi-Build Epoxoline	4

INTERIOR PAINT APPLICATION TABLE

Application Substrata	No. of Coats	Paint Materials and Manufacturer*	Coating Thickness (Mils Per Coat)
Woodwork	1	ProMar 200 Alkyd Enamel	1.9
	2	Undercoater ProMar 200 Int Alkyd Semi-Gloss by Sherwin Williams-OR	1.7
	1	SUPRIME 11 Int Alkyd Wood Primer	1.5
	2	Pro-Hyde Plus Alkyd Satin by Pratt & Lambert - OR -	1.5

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Application Substrata	No. of Coats	Paint Materials and Manufacturer*	Coating Thickness (Mils Per Coat)
	1	System 2H-4 Alkyd by Tnemec	2.5
	2	Tnemec 36-603 Undercoater 2H-Color Hi-Build Tnemec Gloss	2
Drywall	1	ProMar 200 Latex Wall Primer	2.5
	2	ProMar 200 Int Alkyd Semi-Gloss by Sherwin Williams - OR -	1.8
	1	SUPRIME 1 100% Acrylic MP Primer	1.1
	2	Pro-Hyde Plus Latex Satin by Pratt & Lambert - OR -	1.5
	2	System 6-1 Acrylic Latex Low Sheen by Tnemec 6-Color Tnemec-Cryl	2
Metal (Aluminum)	1	SUPRIME 9 Int/Ext Alkyd Metal Primer	1.1
	2	Pro-Hyde Plus Alkyd Satin by Pratt & Lambert - OR -	1.5
	1	DEFLEX 4020 Primer	3
	1	DEFLEX 4206 Semi-Gloss Waterborne Acrylic Enamel	1.5
Metal, New Steel, (Mild Service)	1	Kem Kromik Universal Metal Primer	2.5
	2	ProMar 200 Int Alkyd Semi-Gloss by Sherwin Williams - OR -	1.7
	1	SUPRIME 9 Int/Ext Alkyd Metal Primer	1.1
	2	Pro-Hyde Plus Alkyd Satin by Pratt & Lambert - OR -	1.5
	1	Devguard 4160 Primer followed by	2
	1	Devguard 4308 Alkyd Enamel or	2.5
	2	DEFLEX 4218 DTM Enamel by DeVoe	2
Metal, New Steel, (Severe Service)	1	System 66-2 Epoxy Polyamide by Tnemec	3.5
	1	66-1211 Epoxoline Primer 66-Color Hi-Build Epoxoline	4
Metal, Galvanized Steel, (Mild Service)	1	Galvite Paint	2.0
	2	ProMar 200 Int Alkyd Semi-Gloss by Sherwin Williams - OR -	1.8
	1	SUPRIME 9 Int/Ext Alkyd Metal Primer	1.1
	2	Pro-Hyde Plus Alkyd Satin by Pratt & Lambert - OR -	1.5
	1	Devguard 4020 Primer	3
	2	DEFLEX 4206 S/G Waterborne Acrylic Enamel by DeVoe	1.5
Metal, Galvanized Steel, (Severe Service)	1	System 66-2 Epoxy Polyamide by Tnemec	3.5
	1	66-1211 Epoxoline Primer 66-Color Hi-Build Epoxoline	4
PVC Pipe (Mild Service, Interior)		System 6-1 Acrylic Latex Low Sheen by Tnemec	

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Application Substrata	No. of Coats	Paint Materials and Manufacturer*	Coating Thickness (Mils Per Coat)
Only)	2	6-Color Tnemie Cryl	2
PVC Pipe (Severe Service, Interior or Exterior)	1	System 66-23 Epoxy Polyamide by Tnemie 66-Color Hi-Build Epoxoline	4
Concrete Walls and Ceilings (Mild Service)	1	ProMar 200 Latex Wall Primer	1.1
	2	ProMar 200 Int Alkyd Semi-Gloss by Sherwin Williams - OR - SUPRIME 4 Latex Wall Primer	1.3
	1	Pro-Hyde Plus Latex Satin by Pratt & Lambert	1.2
	2		1.5
Concrete Walls and Ceilings (Severe Service)	2	System 66-4 Epoxy Polyamide by Tnemie 66-Color Hi-Build Epoxoline	4
Porous Masonry Walls (Mild Service)	1	Pre-Prime 167 by Devoc	1.5
	2	ProMar 200 Latex Wall Primer	1.1
	1	ProMar 200 Int Alkyd Semi-Gloss by Sherwin Williams - OR - SUPRIME 4 Latex Wall Primer	1.3
	2	Pro-Hyde Plus Latex Satin by Pratt & Lambert	1.2
Porous Masonry Walls (Severe Service)	1	System 66-15 Epoxy Polyamide by Tnemie	75-100
	2	54-660 Masonry Filler 66-Color Hi-Build Epoxoline	4
Concrete Floors (Mild Service)	1	Pre-Prime 167 by Devoc	1.5
	1	Concrete and Terrazzo Sealer (ANCO Cure and Hard by Intermountain Concrete Specialties.	None
	2	Industrial Enamel by Sherwin Williams - OR -	2
	2	With STAND Alkyd Floor Enamel by Pratt & Lambert - OR -	1
Concrete Floors (Severe or Mild Service)	2	Devguard 4328 Alkyd Enamel by DeVoe	2
	2	System 67-1 Epoxy Polyamide Semi-Gloss by Tnemie 67-Color Tneme Tread	2.5

*Brand names of materials have been used to indicate the types and quantities of materials required. Approved equals will be accepted.

09910.2.3.2

PAINT FOR WASTEWATER SYSTEMS - All paint for concrete and metal surfaces in wastewater systems shall be especially adapted for such use.

- **Fume Resistance.** All paint for final coats shall be fume resistant, compounded with pigments suitable for exposure to sewage gases, especially to hydrogen sulfide and to carbon dioxide. Pigments shall be materials, which do not tend to darken, discolor, or fade due to the action of sewage gases. If a paint manufacturer proposes use of paint which is not designated "fume

resistant" in its literature, it shall furnish full information concerning the pigments used in this paint.

- Lead Paint. No lead paints shall be used.

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09910.2.3.4 PAINT FOR POTABLE WATER SYSTEMS - All paint systems to be used in potable water service shall meet NSF requirements. See also Subsection 09910.2.3.5 below.

09910.2.3.5 PAINT FOR SUBMERGED SURACES

- Coal Tar Epoxy. Coal tar epoxy shall meet and conform with Government Specification Mil P-23236 with further qualification that the coal tar epoxy manufacturer and product must be listed on the current U.S. Navy Qualified Products List. Coal tar epoxy shall be subject to the Engineer's approval.
- Alternate Systems. Alternate coating systems for submerged service, such as Epoxy Polyamide Epoxoline by Tnemec, Epoxy Bar Rust 233H, by DeVoe, or equal, may be required for some applications, or may be approved in lieu of coal tar by the Engineer, upon request. Some colors of Epoxy Polyamide Epoxoline, or equal may be acceptable for use in potable water systems, however the manufacturer must be consulted for verification of acceptability prior to use in potable water applications.

09910.2.3.6 HIGH TEMPERATURE SURFACE TO 400°F - Paint for high temperature surfaces shall be DeVoe Hi-Heat Aluminum HT-4, Glidden 592 Metallite Aluminum, or Sherwin-Williams Silver-Brite Heat resisting aluminum paint B59 S1, or approved equal.

09910.2.4 CLEANING MATERIALS

Cleaning materials shall be best quality solvents, chemicals or detergents, which are commercially prepared for preparing painted surfaces and delivered to the site in sealed containers bearing an identifying label and the manufacturer's name.

09910.3 APPLICATION REQUIREMENTS

ALL paint and coating systems shall be applied in strict accordance with the manufacturer's published instructions for use.

09910.3.1 SURFACE PREPARATION

09910.3.1.1 CLEANING - All surfaces to be painted shall be clean and dry except that in some cases the paint manufacturer's directions may require wetting the surface before painting. Grease and oil shall be removed by wiping with mineral spirits or naphtha per Specification SP-1. Rust, scale, welding slag, and spatter shall be removed and the surface prepared by hand tool cleaning, power tool cleaning, or blast cleaning in accordance with the appropriate Specification SP-2 through SP-10.

09910.3.1.2 METAL SURFACES - Except as otherwise provided, all preparation of metal surfaces shall be in accordance with Specifications SP-1 through SP-10 of the Steel Structures Painting Council (SSPC). Sandblasting procedures shall be as follows:

- No surface, which is to be sandblasted, shall be given a coat of primer or paint in the shop or in the field before sandblasting.

- Unless otherwise specified, all iron or steel surfaces which are to be painted as submerged metal shall be dry sandblasted on the site in accordance with Specification SP-10, near white blast cleaning.

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- Except as otherwise specified, all metal surfaces, which are to be painted as non-submerged metal, shall be commercial blast cleaned per Specification SP-6. This sandblasting shall be done not more than 12 hours ahead of the painting, subject to humidity and weather conditions between the time of sandblasting and painting operations. If any rusting of sandblasted surfaces occurs before painting, such rusting shall be removed by additional sandblasting.
- Threaded portions of valve and gate stems, machined surfaces intended for sliding contact, surfaces to be assembled against gaskets, surfaces of shafts for sprockets or to fit into bearings, machined surfaces of bronze trim on slide gates, and similar surfaces shall be masked off to protect them from the sandblasting of adjacent surfaces.
- Cadmium-plated or galvanized items shall not be sandblasted except that cadmium plated, zinc-plated, or sheradized fasteners used in assembly of equipment to be sandblasted shall be sandblasted in the same manner as the other metal.
- Surfaces which cannot be sandblasted, or cannot be sandblasted and then painted after the assembly of which they are a part has been completed and placed in final position, shall be sandblasted, or sandblasted and painted, before the items are put into final position. In some cases, while the painting could be done after the items concerned were in place, the limitation on time between sandblasting and painting may make it necessary to paint the surfaces before installation of those items.
- Sand or other media residue from sandblasting operations shall be thoroughly removed, using any method necessary and consistent with the requirements of the painting system, including vacuum cleaners or other means.

09910.3.1.3 GALVANIZED SURFACES - Galvanized surfaces which are to be painted shall first be treated with Koppers No. 40 Metal Conditioner; Amercoat No. 59 as manufactured by Amercoat Corporation, Brea, California; Galvaprep No. 5 as manufactured by Amchem Products, Fremont, California; or approved equal.

09910.3.1.4 CONCRETE SURFACES - Concrete and masonry surfaces shall be free of dust, mortar droppings and spatter, fins, loose concrete particles, form release materials, oil, grease, and other deleterious materials. If required by the coating manufacturer, such surfaces shall be etched as specified below or brush off blast cleaned per Specification SP-7.

Concrete surfaces specified to be acid etched shall be etched with a 15 to 20 percent solution of muriatic or sulfamic acid until the surface has the texture of fine sandpaper. The surface shall then be thoroughly scrubbed with clean water, rinsed, and allowed to dry.

09910.3.1.5 WOOD SURFACES - Wood shall be cleaned and dusted immediately prior to painting. Final dusting shall be accomplished using tack cloth. Shelves, drawers, benches, and associated woodwork shall be sanded before painting and lightly sanded between coats. Prior to application of each coat, the surfaces shall be again dusted with tack cloth to remove all dust.

09910.3.1.6 BITUMINOUS PAINTED SURFACES - Surfaces, which are to be painted with other than bituminous paint, and which have a bituminous coating (such as coal tar varnished pipe), shall be sealed with not less than 2 coats of Inertol Tar Stop; Sherwin-Williams Metalatex B42W100;

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Glidden Insulcap as manufactured by the Glidden Company; or approved equal. This seal coating shall be applied in sufficient quantity to permanently prevent bleeding of the bituminous coating.

09910.3.1.7 HIGH TEMPERATURE SURFACES - In general, high temperature paint shall be applied to exposed (un-insulated) steam line valves and traps, heat exchangers, and miscellaneous metal piping and equipment in piping and mechanical systems exposed to high temperatures. The Contractor shall paint these surfaces with two coats of high temperature paint as specified herein or as otherwise shown or directed. No painting shall be done on surfaces with a temperature in excess of 125 degrees F at the time of application. Immediately before application of the first coat of paint, the surface shall be sandblasted according to SSPC-SP-5 (Blast Cleaning to "white" metal). See also Subsection 09910.3.1.2 above.

09910.3.1.8 THINNING -- No thinning of paint other than as directed by the manufacturer's published directions shall be done without the approval of the Engineer. No painting shall be done under conditions, which, in the opinion of the Engineer, will jeopardize the appearance of quality of the painting in any way.

09910.3.1.9 TINTING OF FIRST COAT - When two coats of the same material are specified, the first coat applied shall be tinted with aluminum powder, lampblack, or other suitable pigment to distinguish it from the top coat.

09910.3.1.10 BETWEEN-COATS TREATMENT - All painted surfaces shall be dusted between coats, and high gloss finish shall be lightly sanded and dusted between coats unless otherwise directed by the manufacturer.

09910.3.2 PAINT APPLICATION

09910.3.2.1 PAINTER QUALIFICATIONS - Contractor or subcontractor personnel applying the coating system shall have had past experience in application of the type or types of coatings and under similar conditions that it will be required to meet in this contract. The qualifications of personnel applying the coating system, whether Contractor or subcontractor shall be verified by the Contractor prior to allowing application to proceed. The Contractor shall not subcontract paint application to a subcontractor that is not qualified to apply the coating system.

09910.3.2.2 WEATHER CONDITONS - No painting shall be done under dusty conditions, during or immediately after a rain, during rainy weather, or when the temperature is less than 50°F.

09910.3.2.3 GENERAL REQUIREMENTS FOR LAYING-ON OF PAINT - These requirements shall be as follows:

- All work shall be done in a workmanlike manner, leaving the finished surfaces free from drops, ridges, waves, holidays, laps, or brush marks.
- Where possible, prime coats shall be applied by brush and well worked into the surface, unless directed otherwise by the paint manufacturer.
- Other paints may be applied by brush, roller, trowel, or spray, unless manufacturer's recommendations or these Specifications require a particular method of application.
- Primer and intermediate coats of paint shall be un-scarred and completely integral at the time of application of each succeeding coat.

- Each coat shall be subject to the inspection and approval of the Engineer before the next succeeding coat is applied, and defective work of any kind shall be deemed sufficient cause for re-coating the entire surface involved. ENT 102458:2000 PG 349 of 480
- Where spray application is used, each coat of paint shall be applied to a thickness equivalent to a brush coat application at a coverage rate not greater than that specified by the manufacturer for a brush coat application. All spray painting shall be done with airless type spray units.
- The time interval between paint coats shall meet the recommendations of the paint manufacturer, and these Specifications. The Contractor shall not allow excessive time or exposure between coats, where such excessive time or exposure will impair the bond between the coats.
- The number of coats specified in these Specifications is the minimum to be applied. Suction spots between coats shall be touched up, and additional coats shall be provided if required to produce a finished surface with a solid, even color free from defects.
- The total thickness of the coating shall be as specified. Additional coats of paint shall be added if necessary to bring the total thickness up to not less than that specified. For control, the Contractor shall determine the dry film thickness of the coatings on metal surfaces with a correctly calibrated thickness meter. The Contractor also shall check for holidays with a low voltage holiday detector. The Engineer may use the Contractor's meter and detector for additional inspection and checking deemed necessary.
- Particular care shall be used to assure that the specified coverage is secured on the edges and corners of all surfaces. Additional brush coats shall be applied if necessary to ensure coverage of the edges and corners.
- Damaged paint or scratched painted surfaces shall be sanded smooth before repainting. Sanding and repainting shall be done to such a degree and in such a manner that all evidence of the scratches or damages is obscured.

09910.3.2.4 COAL TAR EPOXY - Application of coal tar epoxy shall be as follows:

- Where called for in the Painting Schedule, shown on the Drawings, or required in these Specifications, concrete and some other submerged surfaces shall be coated with not less than two coats of coal tar epoxy.
- Only components from new, previously unopened containers shall be used to mix coal tar epoxy coatings. Coal tar epoxy shall be mixed and applied in accordance with the manufacturer's recommendations. All coating components shall be mixed with power mixers. The time during pouring or stirring will not be allowed as mixing time. The minimum mixing time as recommended by the manufacturer shall be met. Only unit quantities shall be mixed.
- Coal tar epoxy shall be applied to a total dry film thickness of not less than 16 mils.
- Some metal surfaces may require sandblasting prior to application of the coating system. See Subsection 09910.3.1.2 above.
- In some cases it may also be necessary to apply coatings to parts or subassembly surfaces before they are actually installed at their final Project or system location. All support

brackets, stem guides, pipe clips, fasteners, etc., that are bolted to concrete shall be painted on all sides.

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- Application of coal tar epoxy shall be performed only at the job site unless specific approval is granted for offsite application. Offsite application will not be allowed unless by an applicator with acceptable proven and documented experience in the application of coal tar epoxy systems.
- Each succeeding coat shall be applied over the previous coat as soon as possible in accordance with the manufacturer's instructions, without causing sagging. Succeeding coats shall not be delayed longer than allowed by the manufacturer's instructions. In no case shall the application of subsequent coats be made after the previous coat has set or oxidized. All coats, and the full thickness on all parts, shall be applied before the previous coat has cured. The Contractor shall check the film thickness after application, and before the coating has cured, to ensure that sufficient coating thickness has been applied. If additional coating is necessary, it shall be applied the same day. Checking and control of thickness at this stage shall be the Contractor's obligation and responsibility and not the Engineer's.
- If the surface coating has been applied for a longer period of time than the limits in the Table below, and if it is found that bituminous paint has not been applied to the specified thickness, the areas that are too thin shall be sandblasted to remove the surface film from the coating. These sandblasted areas shall then be washed and cleaned with the solvent recommended by the manufacturer and shall be re-coated within the time limits specified for coating over fresh bituminous paint. Washing or cleaning the surface of the paint with solvents or other solutions will not be a satisfactory substitute for the specified sandblasting if the painted surface is older than the time limits indicated in the table. This applies even if the paint manufacturer approves the solvent method as adequate for preparing the old surface.

TEMPERATURES AND COATING TIMES

Average Temperature	Maximum Time Between Coats
50 - 60° F	36 hours
60 - 70° F	24 hours
70 - 80° F	12 hours
80 - 120° F	4 hours

Coal tar epoxy shall not be applied when the ambient temperature is less than 50 degrees.

09910.3.2.5 **EDGES AND CORNERS** - The Contractor is hereby CAUTIONED that the edges and corners of members are difficult places upon which to build the required thickness of paint. The required thickness must be applied to all surfaces, including the corners and edges, by applying as many spray coats as necessary or by additional brush coats on the corners and edges, if necessary, in order to build up the required thickness.

09910.3.3 **FINISH SCHEDULE**

The Contractor shall finish all work as follows unless indicated otherwise on the drawings or within these Specifications:

TABLE OF FINISH SCHEDULES

NO FINISH	FACTORY FINISH	SITE FINISH
Stainless Steel Surfaces	Heating Units	Interior Concrete Building
Polished Aluminum Surfaces	Electric Control Panel Cabinets	Floors and Walls
Chain Link or Stock Fencing	Cranes & Hoists	Interior Building Walls &
Name Plates	Gauges and Meters	Ceiling
Exterior Concrete	Instruments	All Interior and Exterior
Exterior Masonry Surfaces	Light Fixtures and Cover Plates	Exposed Piping Valves & Pipe
Exposed Plastic Pipe & Fittings	Electrical Wiring & Transformers	Supports
Warning Labels	Ventilating Fans	Exposed Electrical Conduit &
Operating Instructions	Dampers	Junction Boxes
Gratings	Air Conditioning Units	Entry Doors and Frames
Buried or Encased Pipe	Metal Soffit & Fascia Covering	Wood Moldings and Trim
	Roofing and Siding	Other Exterior Surfaces
	Roll-Up Overhead Doors	Indicated on drawings
		Motors, Pumps, Equipment

09910.3.4 CLEANUP

Upon completion of painting, the Contractor shall remove all masking and protective covers and properly dispose of all rubbish, debris and unused paint materials. The Contractor shall remove and cleanup all paint overspray, drips, spatters and etc. from any and all surfaces where it does not belong.

09910.4 METHOD OF MEASUREMENT

09910.4.1 NO MEASUREMENT

Separate measurement for Painting will not be made when painting is included as part of an item, building or structure listed in the Bid Schedule.

09910.4.2 SEPARATE MEASUREMENT

Separate measurement for Painting will be made as a Lump Sum when painting is listed as a separate item in the Bid Schedule.

09910.5 BASIS OF PAYMENT

When Painting is Included as part of the measurement of another item, structure or building listed in the Bid Schedule, separate payment will not be made.

When Painting is required for a specific item, the accepted quantity will be paid for at the contract unit price for:

PAY ITEM	UNIT
Paint (Item Description)	Lump Sum

15230.1

DESCRIPTION

This section covers furnishing and installing valves and fire hydrants in water transmission and distribution lines, together with fittings, thrust blocking, and boxes and enclosures related to the operating equipment.

15230.1.1

RELATED WORK

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Section 02222 - Waterline Pipe Installation
Section 15110 - Pipe and Piping Systems
Section 15232 - Water System Control Valves

15230.1.2

SUBMITTALS

All information shall be provided in accordance with Section 01300. Written evidence of compliance from the manufacturer shall accompany each delivery of material.

15230.1.2.1

VALVES 12 INCHES AND SMALLER, AND HYDRANTS - For valve sizes 12-inches and smaller, and fire hydrants, the Contractor shall furnish the manufacturer's standard data and catalogues for review and approval.

15230.1.2.2

VALVES LARGER THAN 12 INCHES - For all valves sized larger than 12-inches, the Contractor shall furnish shop drawings and technical data prepared by the manufacturer for review and approval.

15230.1.2.3

CONTENT - Submittals shall include complete details, dimensions, weights, diameter of stems, alloy for all valve parts and any information that may be required to assemble, install, operate and maintain the valve.

15230.1.2.4

BUTTERFLY VALVES - Certification of performance together with leakage and hydrostatic tests as described in Section 13 of ASTM/AWWA C-504 shall be furnished to the Engineer upon the Engineer's request.

15230.1.2.5

BALL VALVES - Certification of performance together with leakage and hydrostatic tests as described in Section 5 of ASTM/AWWA C-507, shall be furnished to the Engineer upon the Engineer's request.

15230.1.3

DEFINITIONS

Not used.

15230.2

MATERIALS

15230.2.1

GATE VALVES

15230.2.1.1

COMPLIANCE - All gate valves shall conform to AWWA C-500 or C-509 with the following characteristics:

15230.2.1.2

3-INCH AND SMALLER VALVES - Valves 3-inches and smaller shall be as follows:

- Valves shall be as manufactured by Ford, Hayes, Mueller, Red & White, or an approved equal.
- Valves shall be standard, double-disc, non-rising stem valves with wheel handles.
- Valve bodies shall be all bronze or brass.

- Valves shall be threaded, unless shown otherwise on the Drawings or required in these Specifications.

15230.2.1.3 GATE VALVES 4-INCH THROUGH 14-INCH - Gate valves 4-inches through 14-inches in size shall be as follows:

- Valves shall have a ductile iron body. **ENT 102458:2000 PG 353 of 480**
- Valves shall have a solid cast iron, rubber coated, wedge gate and a resilient seat.
- Gate shall be designed to work equally well with pressure on either side of it.
- Valves shall be of the non-rising stem type and shall be left hand opening (counter-clockwise) with a 2-inch square operating nut.
- All interior ferrous surfaces exposed to fluid flow shall have an NSF approved, fusion bonded, epoxy coating. Epoxy coatings shall be factory applied by an electrostatic or thermosetting process.

15230.2.1.4 GATE VALVES 16-INCHES AND LARGER - Gate valves 16-inches and larger shall be as follows:

- Valves shall be double-disc gate valves with flanged ends.
- Valves shall be manufactured in accordance with AWWA C-500. Bolts, nuts, studs, etc., used with the gear case also shall conform to the requirements for Bonnet Bolting in AWWA C-500.
- Valves shall have bevel gears and shall be actuated by 2-inch square operating nuts.
- The gears and stuffing box shall be enclosed in a watertight cast or ductile iron case for operation in buried location.
- The case shall be filled with grease at the factory.
- Valves shall be designed to operate in a horizontal orientation.
- Valves shall be equipped with bronze tracks, rollers and scrapers.
- By-pass valves shall be furnished with each valve mounted in position A as indicated in AWWA C-500.

15230.2.1.5 VALVES ON WATER MAINS - Valves on water mains shall have the following features:

- In-line valves shall have push-on or mechanical joints conforming to AWWA C-111.
- Valves attached to side outlets shall be flanged.
- By-pass valves shall be flanged.
- Valves in blow-off lines shall be flanged.
- Valves in fire hydrant lines shall have push-on or mechanical joints.
- Valves in air release and vacuum relief lines shall be flanged or threaded as shown on the Drawings.

- Valves 12-inches and smaller shall be equipped with O-ring packing.

15230.2.2 BUTTERFLY VALVES ENT 102458:2000 PG 354 of 480

15230.2.2.1 MANUFACTURE - Butterfly valves shall be Dresser Industries "450", Allis-Chalmers "Streamseal", Henry Pratt "Groundhog", Mueller Lineseal III, or an approved equal.

15230.2.2.2 COMPLIANCE - Butterfly valves shall conform to AWWA C-504.

15230.2.2.3 CLASS - Valves shall be Class 150 seated, tight closing valves, furnished with mechanical or flanged joints

15230.2.2.4 SEATS - Rubber valve seats shall be replaceable without disassembling the valve and shall not be interrupted by the shafting. Rubber seats may be retained on the disc edge by stainless steel clamping in lieu of bonding to the valve body.

15230.2.2.5 SHAFT PACKING - Shaft packing shall be of the self-adjusting permanent type.

15230.2.2.6 OPERATION - Underground opening and closing shall be accomplished with permanently lubricated screw-type operators, totally enclosed and of watertight construction. Overload protection shall be incorporated into the operator allowing the application of 450 foot-pounds input torque at full-open and full-closed positions without damage to the operator or valve. A 2-inch square wrench nut and valve box shall be provided for operating the valve. Valves shall open counter clockwise unless indicated otherwise in the Special Provisions.

15230.2.3 BALL VALVES

15230.2.3.1 MANUFACTURER - Valves shall be produced by a manufacturer having at least five years experience in the manufacture of water works and valves.

15230.2.3.2 VALVES 4-INCHES AND LARGER - Ball valves, 4-inches and larger, shall be ductile iron or cast-steel body, double seated valves meeting the requirements of ANSI/AWWA C-507.

15230.2.3.3 SMALLER VALVES - Smaller valves shall be stainless steel, bronze, or iron bodied valves of the size, type and class shown on the Drawings.

15230.2.4 CHECK VALVES

15230.2.4.1 COMPLIANCE - Check valves shall be manufactured in accordance with ANSI/AWWA C-508.

15230.2.4.2 DESIGN - Check valves shall be of a clear waterway, swing-check type. They shall be designed to be mounted horizontally. They shall be fitted with flanged ends for easy servicing. They shall have an iron body and be bronze mounted.

15230.2.4.3 SEATING - Valves shall be provided with a metal to resilient material seating.

15230.2.5 HOSE BIBBS

Hose bibbs shall be 3/4-inch bronze or brass body, Watts Model SC-1, Red & White Model RW 301 or approved equal. All hose bibs shall have a tee handle.

15230.2.6 SAMPLE FAUCET

Sample faucet shall be 1/2-inch chromed or brass body hose bibs without hose connection threads.

15230.2.7 FIRE HYDRANTS

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15230.2.7.1 COMPLIANCE - Fire hydrants shall conform to standard for dry barrel fire hydrants, AWWA C-502 and modifications herein specified.

15230.2.7.2 DESIGN - Hydrants shall be designed as follows:

- Hydrants shall be of the "compression" or "toggle joint" type with safety flange and safety stem coupling above the ground line so that they can be repaired without shutting off the water.
- Hydrants shall be of the dry top design with two or more "O" rings sealing the water from the operating mechanism.
- Hydrants shall be furnished with 5-inch minimum valve openings, one 4 1/2-inch NST pumper connection and two 2 1/2-inch hose connections.
- Hose nozzle threads, pump nozzle threads, operating nut and opening direction shall match existing hydrants in the system.
- Hydrants shall be designed for 4-feet of cover, unless shown otherwise on the Drawings.

15230.2.7.3 PAINTING - The portion of the hydrant above the ground line shall be painted in accordance with the Owner's standards.

15230.2.8 OPERATING WRENCHES

Unless notified otherwise by the Engineer, the Contractor shall furnish two, T-handle, operating wrenches for each project incorporating valves with 2-inch, square-head, operating nuts.

15230.2.9 VALVE BOXES

Valve boxes shall be cast iron, two piece, and adjustable valve boxes. Valve boxes shall be of the screw type and be of sufficient length for the pipe burial depth required. The cast iron cover of the valve box shall have the word "water" stamped thereon.

15230.2.10 CONCRETE ENCLOSURES

Concrete enclosures for valves shall be precast and of the type, size and configuration shown on the Drawings and shall be fabricated in accordance with the requirements for precast concrete construction provided in Section 03500.

15230.3 CONSTRUCTION REQUIREMENTS

15230.3.1 SETTING VALVES AND VALVE BOXES

All valves shall be set and jointed to the pipe in the manner described for pipe laying and jointing in Section 02222 of these Specifications. Valves shall be oriented with the operating nut vertical. Valve boxes shall be centered and plumb over the operating nut and shall be set so that no shock or stress will be transmitted to the valve. Tops of the valve boxes shall be set flush with the ground surface, concrete collars, or street surfacing, unless otherwise shown on the Drawings.

15230.3.2 VALVE RESTRAINT

Restraint shall be installed on all valves connected with slip-on, gasketed, or O-ring joints (i.e., bell & spigot, mechanical, etc.) in accordance with these Specifications and as shown on the Drawings.

- 15230.3.3 CONNECTING TO EXISTING MAINS ENT 102458:2000 PG 356 of 480
- 15230.3.3.1 CONNECTION TO EXISTING WORK - All connections to existing water mains shall be made by the Contractor, unless otherwise provided in these Specifications. The Contractor shall provide labor and materials, including special fittings and restraint devices, required to make the required connections between existing lines and new lines.
- 15230.3.3.2 INTERRUPTION OF SERVICES - Where the connection of new work to old requires interruption of service, the Owner, Engineer and Contractor shall mutually agree upon a date for such connection which will allow ample time to assemble labor and materials and to notify all customers in accordance with Section 01510.
- 15230.3.4 FIRE HYDRANT INSTALLATION
- 15230.3.4.1 SETTING - All hydrants shall stand plumb with the pumper nozzle facing the street. The hydrant shall be set with the ground line at the location indicated by the hydrant manufacturer.
- 15230.3.4.2 DRAINAGE - Drainage shall be provided at the base of the hydrant by placing clean gravel under and around the base of the hydrant as shown on the Drawings.
- 15230.3.4.3 RESTRAINT - All hydrants shall be restrained by setting thrust blocks or mechanical restraint assemblies in accordance with the Drawings.
- 15230.3.4.4 AUXILIARY GATE VALVES - All fire hydrant assemblies shall include auxiliary gate valves positioned as shown on the Drawings.
- 15230.3.5 THRUST BLOCKS
- Thrust blocks shall be formed to prevent coverage of the pipe joints in accordance with the details shown on the Drawings and as described in Section 03100 and 03050. All thrust blocks shall be set against undisturbed earth.
- 15230.4 METHOD OF MEASUREMENT
- 15230.4.1 VALVES
- Excavation, foundation preparation, restraint devices, valve boxes, backfill, and other miscellaneous devices, materials, or equipment required for installation shall be considered part of and included in the measurement of all valves and valve assemblies.
- 15230.4.1.1 NUMERICAL COUNT - When valves are installed as separate items or assemblies, the measurement shall be determined by counting the number of each size and type (including any associated valve box and concrete valve box collar) of valve installed and accepted.
- 15230.4.1.2 LUMP SUM - When valves are located in an enclosure, measurement shall be made as lump sum for the enclosure assembly and shall include the valve, any supplemental valves and fittings in the enclosure, and the enclosure.
- 15230.4.2 HYDRANTS
- Measurement of hydrants shall be made by counting the number of hydrants set and accepted. For each hydrant, this measurement shall include the shut-off gate valve, excavation and backfill, gravel drain, concrete valve box collar, restraint, and 5-feet of pipeline extending away from the shut-off valve to the tee on the main line.

15230.4.3 NO SEPARATE MEASUREMENT

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No separate measurement will be made for thrust blocks or other restraint provided with valves and fittings. Neither will separate measurement be approved for sample faucets and hose bibbs. Measurement for these items will be included with the quantity of the assembly whereon they are installed.

15230.5 BASIS OF PAYMENT

The accepted quantities will be paid for at the contract unit price.

PAY ITEM	UNIT
Gate Valves (Size) Ball Valves	Each Each Each Each Each
(Size) Butterfly Valve	Each
(Size) Check Valve	
(Size) Fire Hydrant Valve	
(Description) Assembly	

15232.1 DESCRIPTION

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This section covers furnishing and installing water system control valves, including: pressure release, pressure sustaining, pressure reducing, water level control, air relief, vacuum relief, deep well pump control, back flow prevention and surge control with their enclosures and miscellaneous support equipment.

15232.1.1 RELATED WORK

Section 02222 - Waterline Pipe Installation
Section 03050 - Portland Cement Concrete
Section 03100 - Concrete Forming, Finishing and Curing
Section 03200 - Concrete Reinforcement
Section 15110 - Pipe and Piping Systems
Section 15230 - Waterline Valves and Hydrants

15232.1.2 SUBMITTALS

15232.1.2.1 CERTIFICATION OF COMPLIANCE - Certification of compliance to the standards and Specifications contained herein shall be obtained from the manufacturer and provided by the Contractor at the time of delivery of these materials to the project site.

15232.1.2.2 DESCRIPTIVE LITERATURE - Descriptive literature which identifies the manufacturer, model numbers, materials of which the control valves are fabricated, and their capacities shall be provided by the Contractor in accordance with Section 01300 of these Contract Documents.

15232.1.2.3 OPERATION AND MAINTENANCE INSTRUCTIONS - Manufacturer's installation, operation and maintenance literature for each control valve shall be furnished to the Owner prior to the time of final acceptance for payment.

15232.1.3 DEFINITIONS

Not used.

15232.2 MATERIALS

15232.2.1 GENERAL

All control valves furnished and installed under this contract shall be of the model, size, and type shown on the Drawings or required in these Specifications. They shall have been produced by the same manufacturer and shall be provided by a supplier located in the state in which the installation is to be made. They shall be furnished with a manufacturer applied, NSF approved, fusion bonded, epoxy coating. Seats shall be designed so that they are easily maintained and without edges that induce cutting or wear at low flows. Unless otherwise required to meet specific service conditions, all cast iron or steel valves shall be 150 lb. Class.

15232.2.2 ALTITUDE CONTROL VALVES

Altitude control valves shall be as manufactured by CLA-VAL Company, or approved equal. Valves shall be of ductile iron flanged, spring loaded, 3-way, diaphragm actuated, globe pattern valves. Valve control shall be provided by a pressure difference sensor (and when called for on the Drawings or in these Specifications, fitted with a direct acting solenoid control) with appropriately sized piping and supports. Valves shall have a valve position indicator, cocks to isolate the pilot system and closing speed control. Four-inch and smaller valves shall be fitted with flow clean strainer while larger valves shall be provided with a "Y"-pattern strainer in the pilot control system.

- 15232.2.3 PRESSURE RELIEF/PRESSURE SUSTAINING VALVES
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Shall be ductile iron, modulating, hydraulic operated, pilot controlled, flanged valves with globe pattern. All pressure sustaining valves shall be designed to maintain constant upstream pressure at the set point indicated on the Drawings or in the Special Provisions. Pressure sustaining valves shall be provided with a position indicator operated by a pressure difference sensor and shall have appropriately sized piping and supports. The pilot system shall be capable of being isolated with shut-off cocks, be fitted with a strainer, and shall be able to control closure to prevent surges.
- 15232.2.4 COMBINATION BACK PRESSURE/SOLENOID SHUTOFF VALVE
Shall be ductile iron, flanged, globe pattern, modulating hydraulic operated, pilot controlled, with solenoid activated shut-off. The valve shall open sufficiently to maintain a pre-set inlet (back) pressure. When the inlet pressure is less than the control setting, the pilot system shall close the valve tight. The pilot system shall be capable of being isolated with shut-off cocks, be fitted with a strainer and shall be able to control closure to prevent surges.
- 15232.2.5 PRESSURE REDUCING VALVES
Shall be modulating pressure reducing with globe pattern. Valves shall be provided with pilot control which operates such that positive and gradual closure can occur to prevent any surge or line shock. Pressure reducing valves shall be equipped with a valve position indicator, cocks to isolate the pilot system, speed for control of closure and a strainer on the pilot system inlet.
- 15232.2.6 BACK-FLOW PREVENTION VALVES
Shall be an assembly of double independently acting, spring-loaded toggle lever check valves with two shut-off valves which meet the requirements of ANSI/AWWA C-506. Valve body and cover shall be of bronze. Valves shall be fitted with stainless steel springs and with molded synthetic rubber clapper, poppet and facing rings.
- 15232.2.7 AIR/VACUUM RELIEF VALVES
Shall be simple lever type, kinetic combination air valves, with cast iron body and stainless steel floats. Vents for air/vacuum relief valves shall be threaded GI pipe and shall be protected with fittings covered with No. 14 stainless steel, bronze or aluminum screen.
- 15232.2.8 DEEP WELL SOLENOID PUMP CONTROL VALVE
Shall be globe pattern, hydraulically operated diaphragm valve controlled by a solenoid pilot valve. The pilot system shall have separate adjustable flow control valves, a "Y" strainer, and shall be fitted with cocks to enable isolation during servicing. The valve stem shall have a limit switch to serve as an electrical interlock between the valve and pump motor.
- 15232.2.9 ENCLOSURES
Enclosures for control valves shall be concrete, furnished and installed in accordance with the Drawings and the requirements of Sections 03100, 03200, and 03050 of these Specifications.
- 15232.2.10 MISCELLANEOUS PIPE, FITTINGS, VALVES AND EQUIPMENT
Miscellaneous pipe, fittings, valves and equipment needed to assemble and support operation of the control valves shall be as shown on the Drawings and in conformance with Sections 02222, 15110, and 15230 of these Specifications.

15232.3 CONSTRUCTION REQUIREMENTS

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Prior to installing control valves, the Contractor shall flush, blowout, or otherwise clean all dirt and debris from connecting lines. Control valves shall be installed with appropriate supporting piping and equipment in accordance with manufacturer's recommendations. Control valves shall be fitted with flanged connections or installed in a manner which will allow easy removal in the enclosure or area wherein the valves are installed. As soon as control valves are pressurized (placed in service), the Contractor shall check and adjust, if necessary, all valve assemblies to assure they are adjusted correctly and functioning as designed.

15232.4 METHOD OF MEASUREMENT

15232.4.1 NO MEASUREMENT

Measurement will not be made for control valves that are installed as part of a structure or assembly identified as a separate line item in the Bid Schedule. In such cases, valves and their installation will be included in the lump sum quantity represented for that structure.

15232.4.2 SEPARATE MEASUREMENT

When valves are identified as individual line items on the Bid Schedule, quantities shall be measured by counting the numbers of each type of valve in place and accepted. In such cases, measurement will include all valves, couplings, enclosures, manhole covers, excavating and footings required and other necessary equipment and materials required to complete the assembly as shown on the Drawings.

15232.5 BASIS OF PAYMENT

The accepted quantity will be paid for at the contract unit price:

PAY ITEM	UNIT
Altitude Valve (size, type)	Each
Float Valve (size, type)	Each
Pressure Relief Valve (size, type)	Each
Pressure Sustaining Valve (size, type)	Each
Pressure Reducing Valve (size, type)	Each
Back Pressure Valve (size, type)	Each
Backflow Prevention Valve (size, type)	Each
Air Release Valve (size, type)	Each
Vacuum Relief Valve (size, type)	Each
Air/Vacuum Relief Valve (size, type)	Each
Combination Air/Vacuum Valve (size, type)	Each
Sewage Air Relief Valve (size, type)	Each
(Type)Valve Assembly	Each

15234.1 DESCRIPTION

Includes furnishing and installing materials which include excavation, water main tapping, stops, valves, service lines, meters, settings, boxes and other accessories required for installing water services to system users.

15234.1.1 RELATED WORK

Section 02200 - Trench Excavation and Backfill ENT 102458:2000 PG 361 of 480
Section 02222 - Waterline Pipe Installation
Section 15110 - Pipe and Piping Systems

15234.1.2 SUBMITTALS

15234.1.2.1 DESCRIPTIVE LITERATURE - Descriptive literature which identifies the manufacturer, model, size, material and parts lists from which the piping, fittings, valves and meters are manufactured, including installation instructions, shall be provided to the Engineer in accordance with Section 01300.

15234.1.2.2 CERTIFICATION OF COMPLIANCE - Written certification of compliance from the respective manufacturer shall be provided with each delivery of metal fittings, valves and meters.

15234.1.3 DEFINITIONS

Mains - Water distribution pipes, located in streets or rights-of-ways, to which water service connections are made for users of the system.

Tap - The actual connection made to water mains which includes drilling an opening into the main, threading, installing a tapping saddle when appropriate, and inserting (screwing) a valve into the opening.

Saddle - A fitting placed on a pipe to reinforce the pipe wall through which the tapping hole is drilled.

Key - Can mean either: the center piece of a corporation or curb valve which is turned to control flow through the valve; or, the "T-shaped" tool used by operators to reach and turn the key or closing piece of a valve.

Setter (also referred to as "yoke") - Is the prefabricated assembly of pipes and valves installed in a meter box and connected into the service line in which the water meter is mounted (or "set").

15234.2 MATERIALS

15234.2.1 SADDLES

Saddles shall be copper alloy body with copper alloy or stainless steel straps designed and sized specifically for tapping PVC water mains. Threading shall be tapered and the saddle shall conform to ANSI/AWWA C-800. Straps shall provide full support around the circumference of the pipe and have a bearing area of sufficient width along the pipe axis so that the pipe will not be distorted when tightened.

- 15234.2.2 CORPORATION STOPS ENT 102458:2000 PG 362 of 480
- Corporation stops shall be copper alloy body ball-type or balanced pressure, o-ring sealed plug type valves with tapered threads and in conformance with the requirements of ANSI/AWWA C-800.
- 15234.2.3 CURB VALVES
- Curb valves shall be copper alloy body ball-type valves; or balanced pressure, o-ring sealed, plug type valves. Curb valves shall be furnished with cast iron curb boxes and one piece lids fitted with copper alloy pentagon plug. The curb box shall be sized to properly fit the valve and adjust to the depth to which the valve is set.
- 15234.2.4 SERVICE LATERAL PIPE
- Service lateral pipe shall be as called for on the Drawings and in accordance with the following:
- 15234.2.4.1 COPPER SERVICE PIPE - Copper service pipe shall be Type K soft, conforming to Federal specification WW-T-799 or ASTM B88-62.
- 15234.2.4.2 POLYETHYLENE PIPE - Polyethylene service pipe shall conform to the requirements of AWWA C-901, "Polyethylene (PE) Pressure Pipe, Tubing and Fittings, 2-inch through 3-inch for water." PE Pipe shall be pressure tubing conforming to Table 6 of said specification. Tubing shall be Class 160 with a DR of 9.0 or Class 200 with a DR of 7.3. If not specified, DR 7.3 shall be used.
- 15234.2.4.3 Ends of polyethylene tubing inserted in compression connections should be fitted with insert reinforcement.
- 15234.2.5 METER SETTER (YOKE)
- Meter setter shall be fit with copper tubing (when required) and copper alloy and copper alloy fittings. Setters shall be furnished with copper alloy body, angle or straight, ball-type inlet valves with fittings appropriately sized to fit the meter. When required, a cast iron yoke ban shall be furnished to provide the setting.
- 15234.2.6 CHECK VALVE
- Unless indicated otherwise on the Drawings, a check valve shall be provided with each meter setting. Check valves shall be copper alloy bodied, dual valves which meet the requirements of the State and local health authorities and conform to ASTM/AWWA C-510.
- 15234.2.7 WATER METERS
- Water meters shall be cold water displacement type meters which complies with ANSI/AWWA C-700. The main case and bottom plate shall be of bronze and the meter shall be sized and equipped as shown on the Drawings. The meters shall be Model SR II by SENSUS Technologies, PMM Multi-Jet Series by Precision Meters, or an approved equal.

15234.2.8 METER BOX

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Meter boxes shall be fabricated from rigid PVC or ABS plastic pipe. They shall have a minimum diameter of 18-inches, be sized to fit over the meter assembly while allowing reasonable interior access, and shall make an appropriate fit with the meter box ring and cover.

15234.2.9 METER BOX RING AND COVER

The meter box ring and cover shall be cast iron with a minimum diameter of 18-inches but shall be appropriately sized to fit larger meter boxes where required. The words "WATER METER" shall be cast into the cover. The cover shall be a locking type with a pentagonal head, corrosion resistant, screw down, locking device.

15234.2.10 METER BOX DRAINAGE

Meter box drainage shall be provided by placing 3-cubic yards of drain gravel at the base of new meter box drain.

15234.3 CONSTRUCTION REQUIREMENTS

15234.3.1 TRENCHING AND BACKFILL

Trenching and backfill for installation of service connections shall be completed in accordance with Section 02200. Service lines shall have a minimum of 3.5-feet of cover.

15234.3.2 INSTALLATION OF CONNECTIONS

Installation of water service connection components shall be as shown on the Drawings. All connections to PVC pipe shall be made by using a saddle rather than a direct tap. Service lines shall be slightly snaked in the trench near the connection to the water main to allow for some movement to avoid a rigid connection.

15234.3.3 REPLACEMENT OF EXISTING FACILITIES

When replacement of specified components of service connections is required, the Contractor shall: protect existing equipment, provide appropriate connecting fittings to accommodate the new component, use care in removal and salvaging of the existing component and deliver the existing components to the Owner's maintenance shop or headquarters.

15234.4 METHOD OF MEASUREMENT

15234.5.1 CONNECTIONS

Measurement for service connections shall be made by counting the number of "each" size of connection (consisting of furnishing and installing: (1) service saddle on the water main; (2) drilling and tapping; (3) corporation stop; and (4) the necessary excavation and backfilling) installed and accepted.

15234.5.2 SERVICE LATERALS

Service laterals shall be measured using an accurate measuring device to determine the number of linear feet of each size of service lateral pipe installed between the corporation stop and the meter

setter. This measurement shall include furnishing and installing the pipe and appropriate connecting fittings and any necessary trench excavation and backfilling.

15234.5.3 SERVICE METER SETTER ASSEMBLY

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Measurement of service meter setter assemblies shall be made by counting the number of each size of assembly furnished, installed, and accepted. This measurement shall include the curb stop meter setter, connecting fittings, meter box, lid, drain gravel, and the necessary excavation and backfilling.

15234.5.4 WATER METERS

Measurement of water meters shall be made by counting the number of meters of each size furnished, installed, and accepted.

15234.5.5 STOCK WATERING TAPS

Measurement for stock watering taps shall be made by counting the number of each size of connection installed and accepted. This measurement shall include furnishing and installing: (1) service saddle on the water main; (2) drilling and tapping; (3) corporation stop; (4) 20-foot of service lateral; (5) curb stop and box; and (6) the necessary excavation and backfilling required to complete the connection.

15234.5.5 REPLACEMENT OF EXISTING FACILITIES

Where certain components of a total existing water service connection are to be replaced, measurement will be made by counting the number of each size and/or kind of the specifically identified component or components as shown in the Bid Schedule as installed and accepted. Such measurement shall include furnishing and installing the identified component, necessary excavation and backfill, and salvaging and delivery of any replaced component when designated.

15234.5 BASIS OF PAYMENT

The accepted quantities shall be paid for at the contract unit price for:

PAY ITEM	UNIT
(Size) Service Connection	Each
(Size) Service Lateral	Linear Foot
(Size) Service Meter Assembly	Each
(Size) Meter	Each
Replace (Size) (Component Name)	Each
Install (Size) (Component Name)	Each
(Size) Stock Watering Tap	Each

15236.1 DESCRIPTION

Includes furnishing and installing tubular flanged water flow meter(s) of the size and type and location shown on the Drawings and as described in these Specifications.

15236.1.1 RELATED WORK

Section 02222.- Pipe Installation

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15236.1.2 SUBMITTALS

The Contractor shall provide complete information which includes cutaway drawings, parts lists, and manufacturer's installation instructions in accordance with the requirements of Section 01300.

15236.1.3 DEFINITIONS

Not used.

15236.2 MATERIALS

15236.2.1 PERFORMANCE CAPABILITY

Flow meters shall be able to accurately operate in working pressures up to 150 PSI, at temperatures up to 140 degrees F. and for flows 40 GPM and greater. Meter sizes and measuring capacity shall be as shown on the Drawings. The meter's flow indicator shall be mechanically driven with a 3.5-inch (minimum) dial that provides a flow reading and totalizer reading up to six digits in GPM and total gallons. Meters installed in systems or at locations which are controlled by an electronic telemetry system shall be furnished with flow transmitters which can be connected into that system to indicate flow conditions.

15236.2.2 FABRICATION

Flow meters shall be manufactured to meet the requirements of ANSI/AWWA C-704 with a steel meter tube fitted with straightening vanes, all of which is coated with a fusion epoxy resin. Interior components of the meter shall be fabricated from stainless steel, plastic or other corrosion resistant materials which will provide long service. The propeller shall be magnetically connected to the drive mechanism and mounted with bearings which provide smooth operation for flows in both directions. The gearbox shall be cast bronze and the meter head shall be fabricated from cast iron or epoxy coated steel.

15236.3 CONSTRUCTION REQUIREMENTS

Flow meters shall be installed in accordance with the manufacturer's recommendations and consistent with the Drawings. The Contractor shall provide all materials and installation labor to assure proper installation and calibration of the meter(s) required.

15236.4 METHOD OF MEASUREMENT

15236.4.1 NO MEASUREMENT

Separate measurement will not be made for flow meters when installed as a component of a building, enclosure or assembly for which measurement is indicated in the Bid Schedule.

15236.4.2 SEPARATE MEASUREMENT

Separate measurement may be made for meters furnished and installed when so identified in the Bid Schedule. Measurement shall be made by counting the number of each size and type of valve installed and accepted.

15236.5 BASIS OF PAYMENT

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The accepted quantities will be paid for at the contract unit price for:

PAY ITEM	UNIT
(Size) Flow Meter	Each

15238.1 DESCRIPTION

Includes furnishing and installing pressure gauges and their support piping and fittings in buildings and other structures at locations shown on the Drawings.

15238.1.1 RELATED WORK

Section 02222 - Waterline Pipe Installation
Section 15110 - Pipe and Piping Systems

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15238.1.2 SUBMITTALS

The Contractor shall provide descriptive information which indicates the model number, manufacturer's name, dimensions, measuring range and manufacturer's certification of performance in accordance with the requirements of Section 01300.

15238.1.3 DEFINITIONS

Not used.

15238.2 MATERIALS

15238.2.1 PRESSURE GAUGES

Shall be US Gauge, Model 550L, stem mounted and oil filled, as manufactured by AMETEK or an approved equal. Gauges have a 2 1/2-inch (minimum) stainless steel case with a pressure relief plug. The window shall be polycarbonate plastic with neoprene sealing gasket. The pressure reading range shall be as shown on the Drawings or as prescribed in the Special Provisions.

15238.2.2 SUPPORTING PIPE AND FITTINGS

Shall be 1/4-inch threaded Schedule 40 galvanized pipe.

15238.3 CONSTRUCTION REQUIREMENTS

Pressure gauges shall be installed in accordance with the manufacturer's recommendations and at the locations shown on the Drawings. The Contractor shall provide sufficient supporting pipe to mount pressure gauges vertically and oriented to be read easily. When possible, pressure gauges should be installed at least three pipe diameters downstream from any valve in the pipeline.

15238.4 METHOD OF MEASUREMENT

Separate measurement of pressure gauges and their supporting piping will not be made. Measurement will be included with the building or structure that it serves.

15238.5 BASIS OF PAYMENT

Separate payment for pressure gauges will not be made.

15300.1

DESCRIPTION

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The Contractor shall furnish and install floor drains in structures of the size and type, and at the locations shown on the Drawings.

15300.1.1

RELATED WORK

Section 02222 - Waterline Pipe Installation
Section 02105 - Earthwork Materials

15300.1.2

SUBMITTALS

Not used.

15300.1.3

DEFINITIONS

Not used.

15300.2

MATERIALS

15300.2.1

DRAIN

Floor Drains shall be cast iron body, 6-inch (minimum) diameter heavy-duty grated type with a removable cast iron or stainless steel cover.

15300.2.2

PIPING

Drain piping shall be drain waste and vent (DWV) schedule 40 PVC pipe and fittings sized to fit the floor drain in accordance with the Drawings.

15300.2.3

P-TRAPS

P-traps, when required on the Drawings, shall meet the requirements of Schedule 40 PVC pipe fittings sized to fit the drainpipe.

15300.2.4

DRAIN GRAVEL

Drain gravel for floor drain sumps, where applicable, shall meet requirements of Section 02105 and shall be installed as shown on the Drawings.

15300.2.5

CHECK VALVES

Floor drain check valve, when required by the Drawings, shall be a rubber slip-on check valve capable of draining drainpipe under low flows and low pressures. The valves shall require no maintenance or repair. The check valves shall be attached to the drainpipe by stainless steel clamps.

15300.3

CONSTRUCTION REQUIREMENTS

15300.3.1

SETTING DRAINS

Where floor drains are required, the floor will have been designed with a slope to a low point where the drain is to be placed. Typically, the floor drain will be cast in the low point in the floor

at the time of installation of the floor. The Contractor shall take care to coordinate the setting of the drain and the pouring of the concrete so that the top surface of the drain cover is flush with the floor surface to allow complete drainage of any water which accumulates on the floor.

15300.3.2 **PIPE WORK**

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Piping shall be connected and run on a 1% minimum slope away from the drain as shown on the Drawings. Where termination of the piping is in drain gravel, care shall be taken to locate the pipe end in the top one-third of the gravel sump. Where termination of the piping is at daylight, the Contractor shall provide a 5-foot section of cast iron or ductile iron pipe, sized to match the drain pipe, at the daylight end of the pipeline so that the thermoplastic pipe will not be exposed to daylight.

15300.4 **METHOD OF MEASUREMENT**

15300.4.1 **NO MEASUREMENT**

Unless provided for as a separate bid item in the Bid Schedule, no separate measurement of the floor drain, its connecting piping, gravel sump, etc., will be made. Measurement of the drain will be included with the building or structure identified in the Bid Schedule.

15300.4.2 **SEPARATE MEASUREMENT**

When provided for in the Bid Schedule, the cost of all material and labor required of the floor drain assembly will be measured by counting the number of floor drain assemblies installed and accepted.

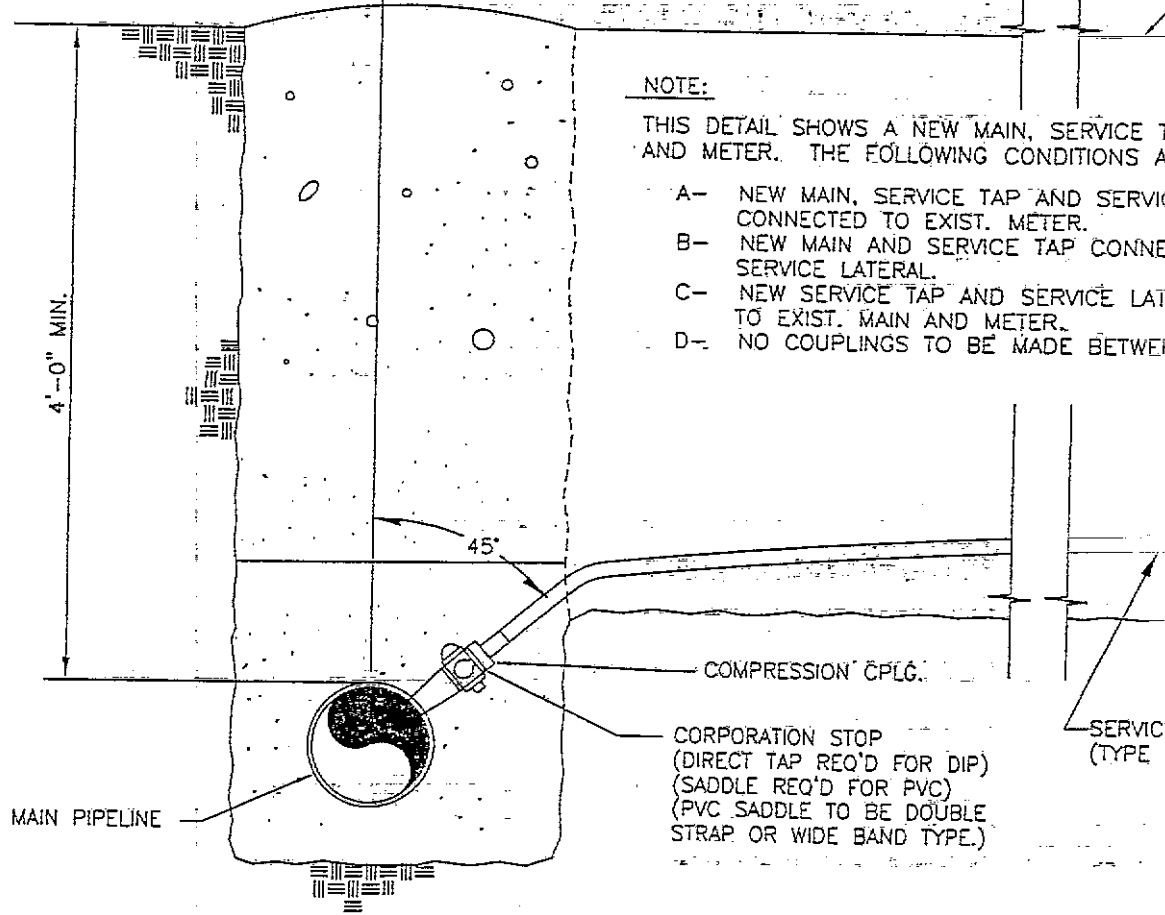
15300.5 **BASIS OF PAYMENT**

When a separate bid item is provided, complete compensation for this accepted work shall be included in the contract unit price on the Bid Schedule.

PAY ITEM	UNIT
Floor Drain Assembly	Lump Sum
Floor Drain Assembly	Each

Water Thrustblock

and k Details



NOTE:

THIS DETAIL SHOWS A NEW MAIN, SERVICE TAP AND METER. THE FOLLOWING CONDITIONS APPLY:

- A- NEW MAIN, SERVICE TAP AND SERVICE LATERAL CONNECTED TO EXIST. METER.
- B- NEW MAIN AND SERVICE TAP CONNECTED TO EXIST. SERVICE LATERAL.
- C- NEW SERVICE TAP AND SERVICE LATERAL CONNECTED TO EXIST. MAIN AND METER.
- D- NO COUPLINGS TO BE MADE BETWEEN MAIN AND SERVICE LATERAL.

MAIN PIPELINE

45°

COMPRESSION CPLG.

CORPORATION STOP
(DIRECT TAP REQ'D FOR DIP)
(SADDLE REQ'D FOR PVC)
(PVC SADDLE TO BE DOUBLE STRAP OR WIDE BAND TYPE.)

SERVICE (TYPE)

DETAIL — WATER
NO SCALE

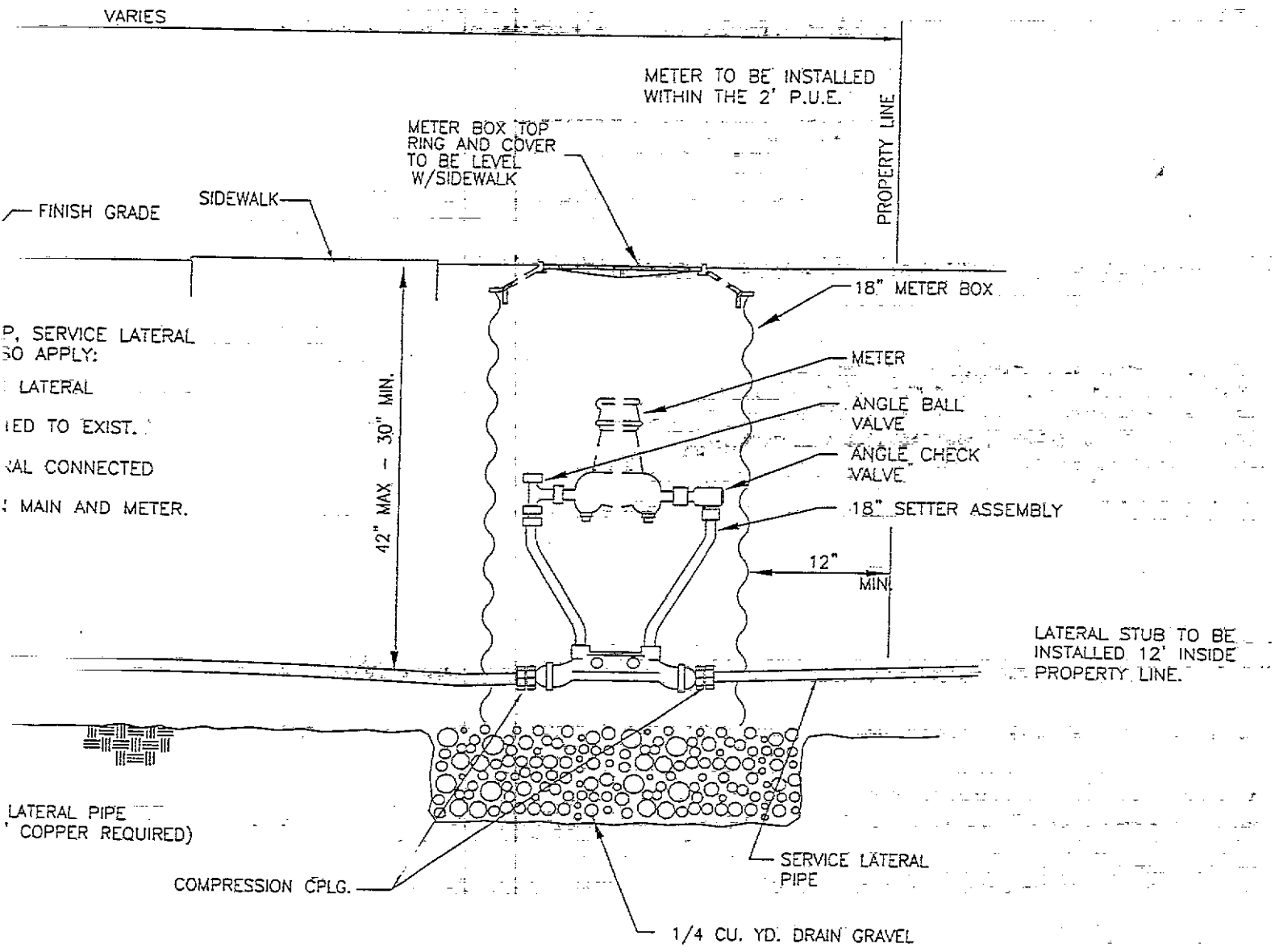
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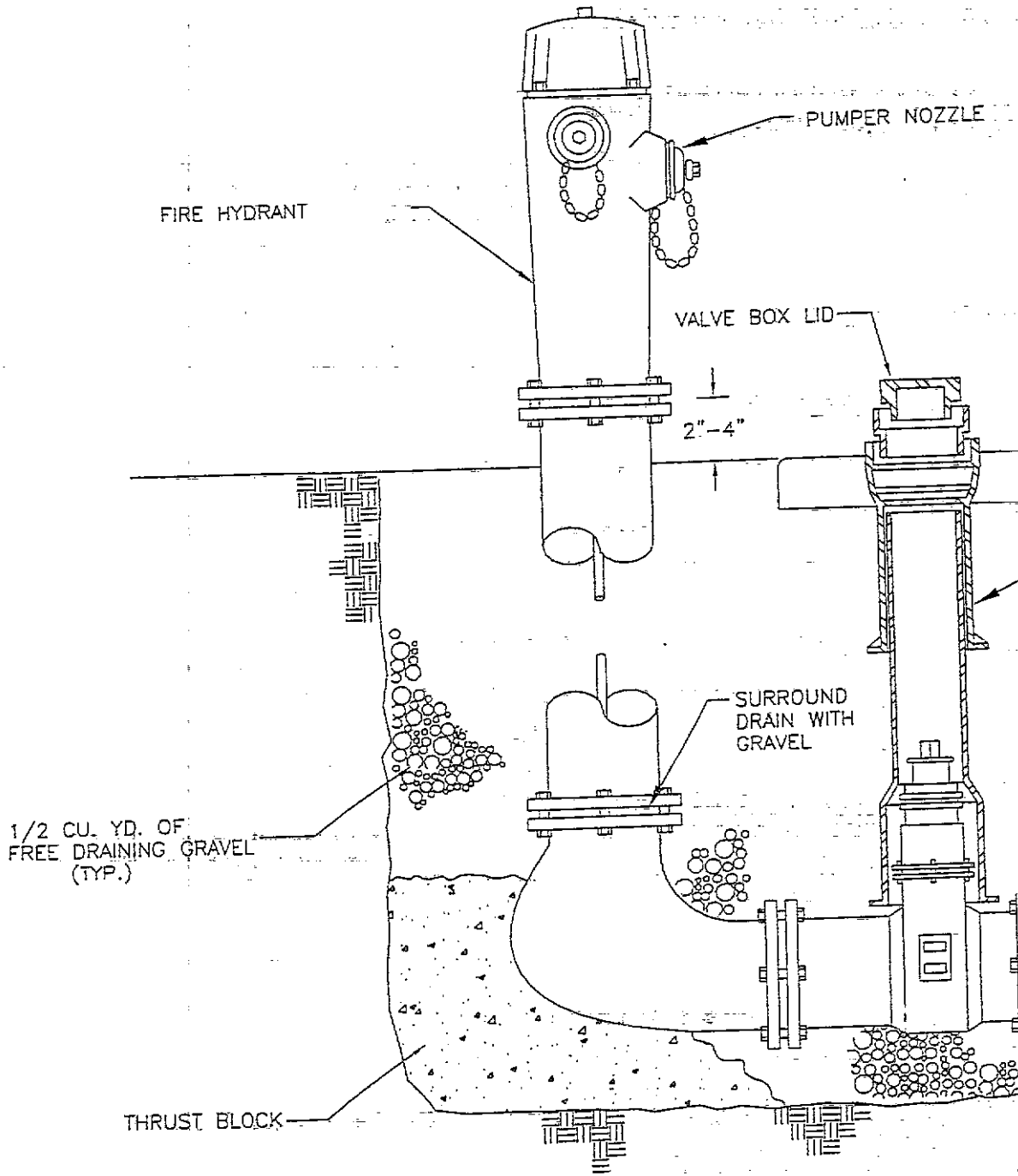
SERVICE CONNECTION

SANTAQUIN CITY
CONSTRUCTION STANDARDS

WATER SERVICE

W-1

DESIGN
DRAWN BY
CHECK
SCALE
REVISION DATE & NUMBER



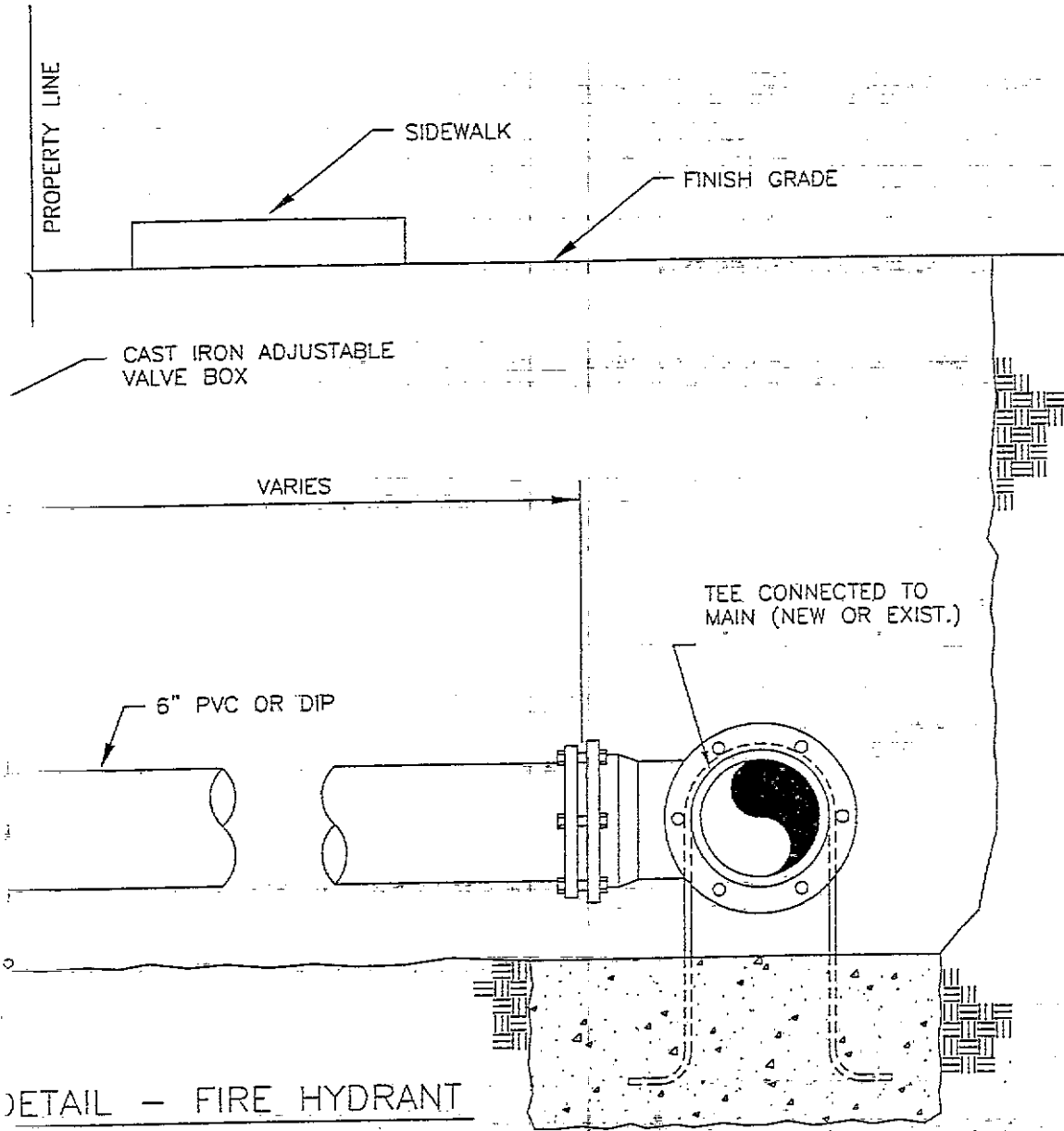
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DETAIL — FIRE HYDRANT
NO SCALE

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FIRE HYDRANT

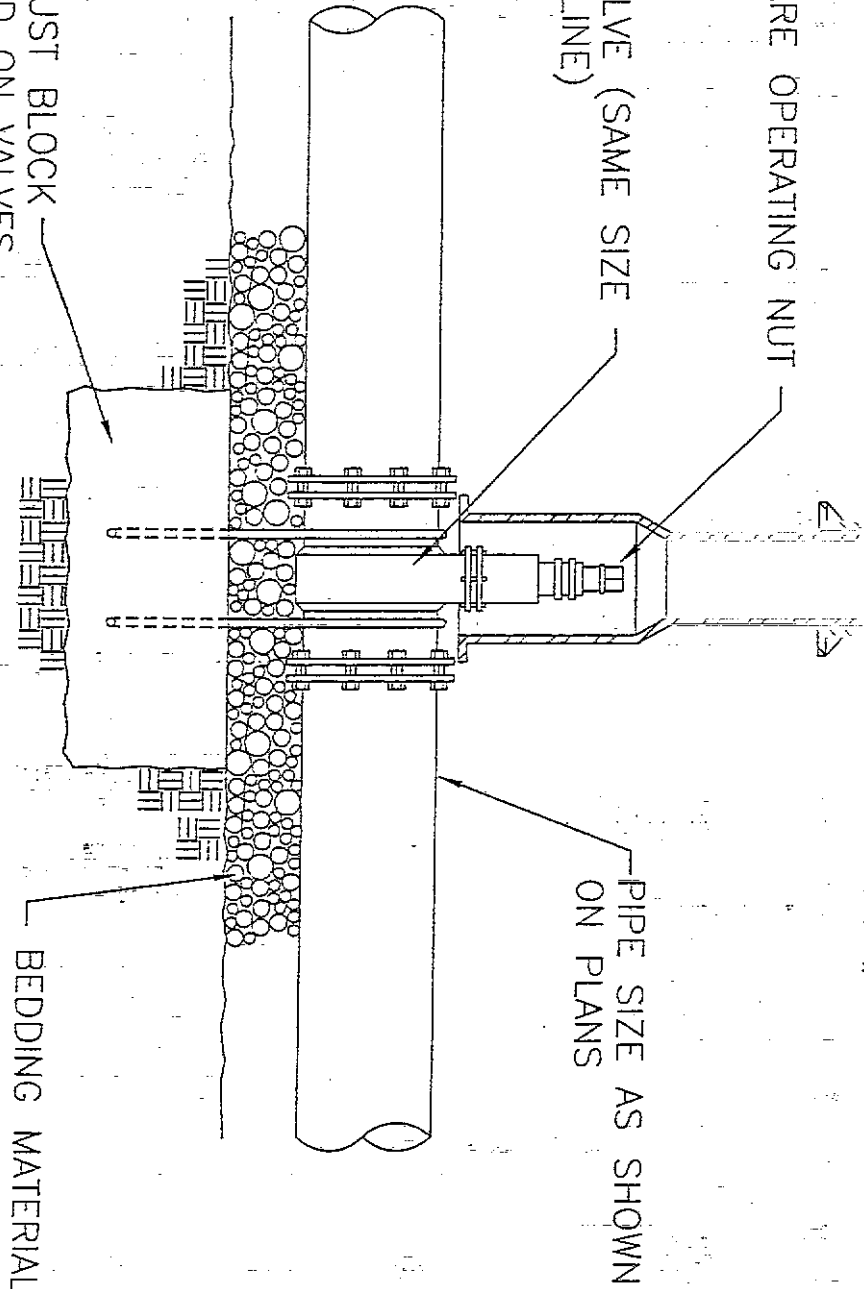
W-2

DESIGN
DRAWN BY
DATE
SCALE
REVISION DATE & NAME

2" SQUARE OPERATING NUT

GATE VALVE (SAME SIZE AS PIPELINE)

CONC. THRUST BLOCK TO BE USED ON VALVES 12" AND LARGER



PIPE SIZE AS SHOWN ON PLANS

BEDDING MATERIAL

SECTION A-A

DETAIL - GATE VALVE
NO SCALE

(4) #5 BARS

FILE: SANT NWSIAN WTR03

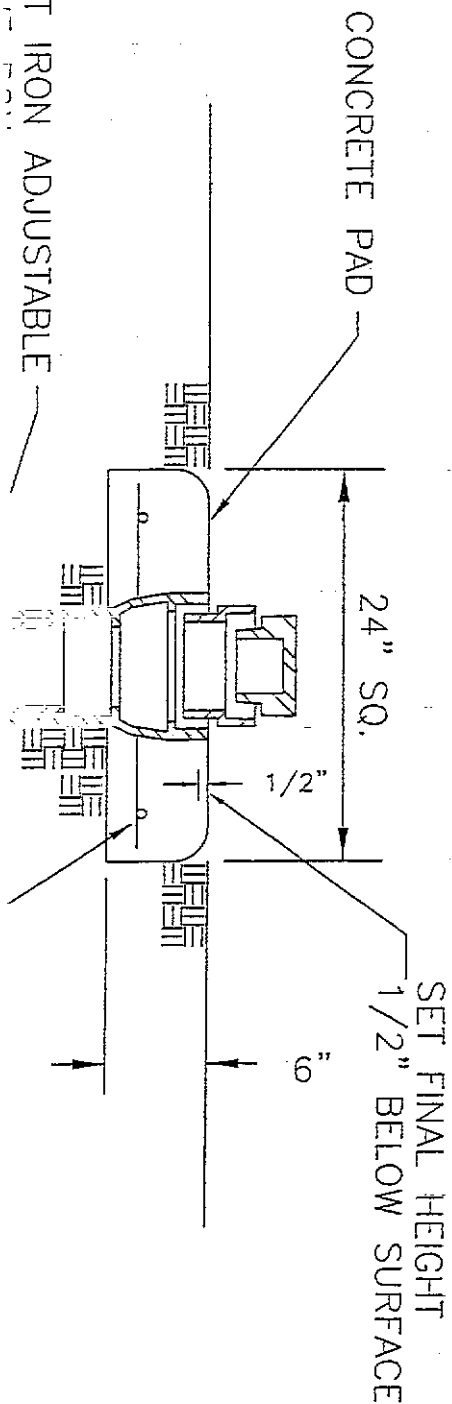


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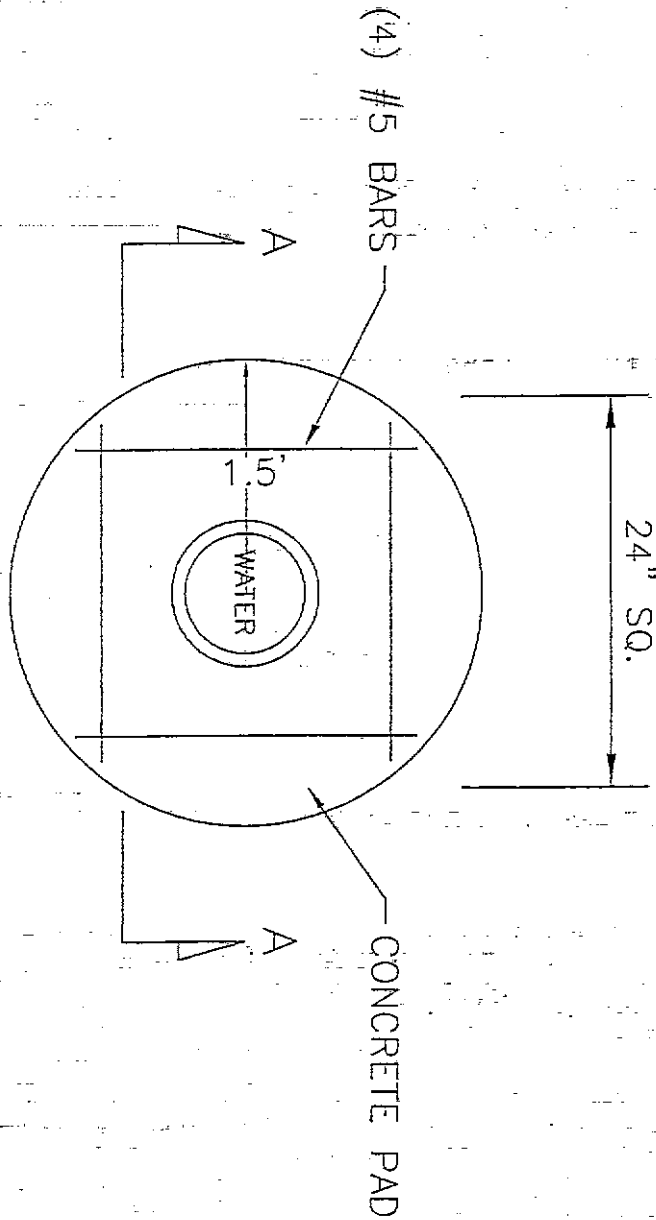
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CAST IRON ADJUSTABLE



PLAN



SANTAQUIN CITY
CONSTRUCTION STANDARDS

GATE VALVE

W-3

REVISION
DATE
BY
SCALE
APPROVED BY

3"

BEDDING AREA TO BE 1/2 OF PIPE DIAMETER W/ 9" MINIMUM.



PIPELINE

DETAIL - TRENCH THRU ASPHALT ROAD
NO SCALE

NOTE:

- 1. ASPHALT ROADS SHALL BE SAW CUT.
 - 2. ADD FLOWABLE BACKFILL FOR ALL ROADWAY ASPHALT CUTS FOR WINTER MONTHS
- BSC= BITUMINOUS SURFACE COURSE
 UBC= UNTREATED BASE COURSE

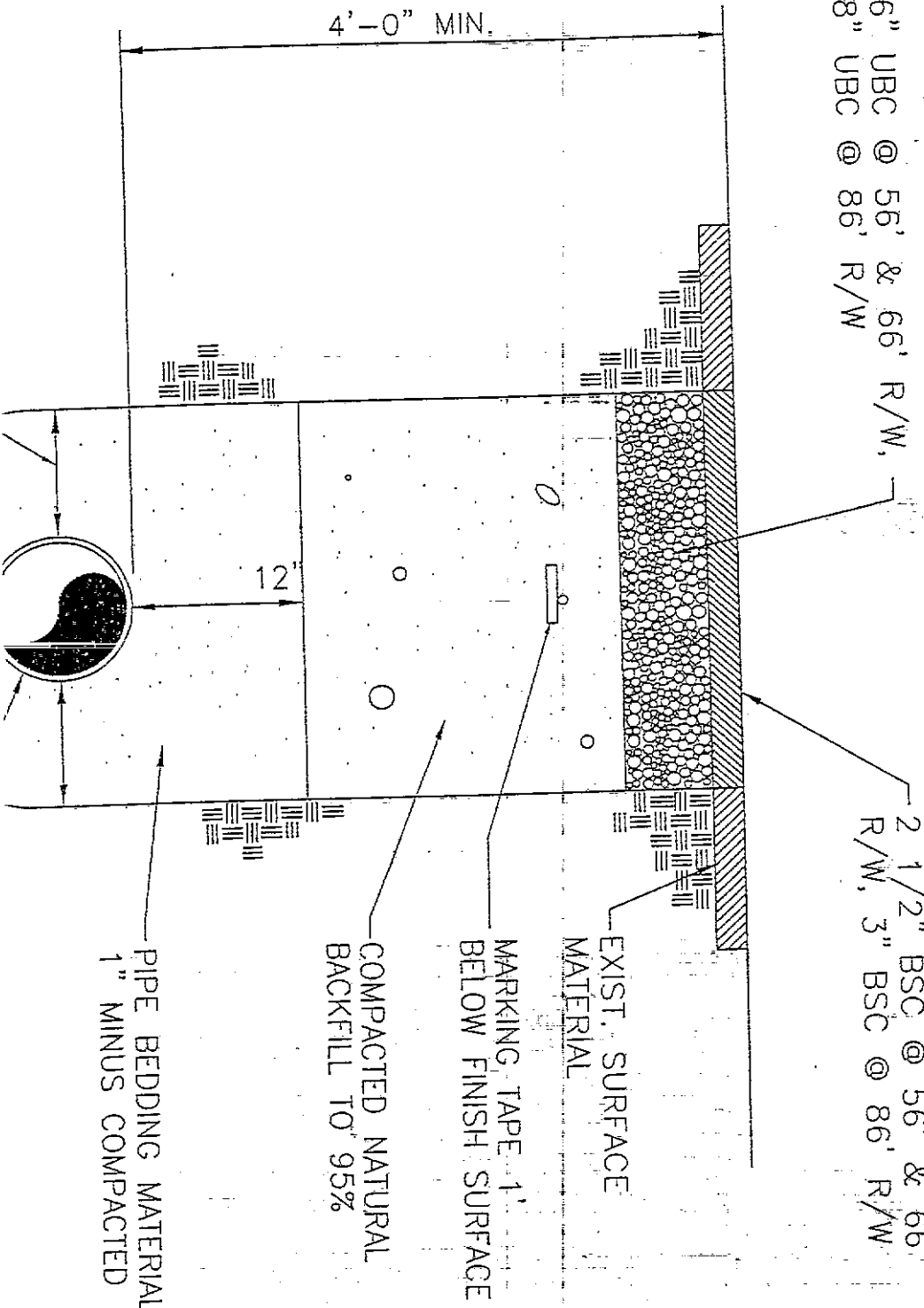
FILE: SANT NWSTAN WTR04



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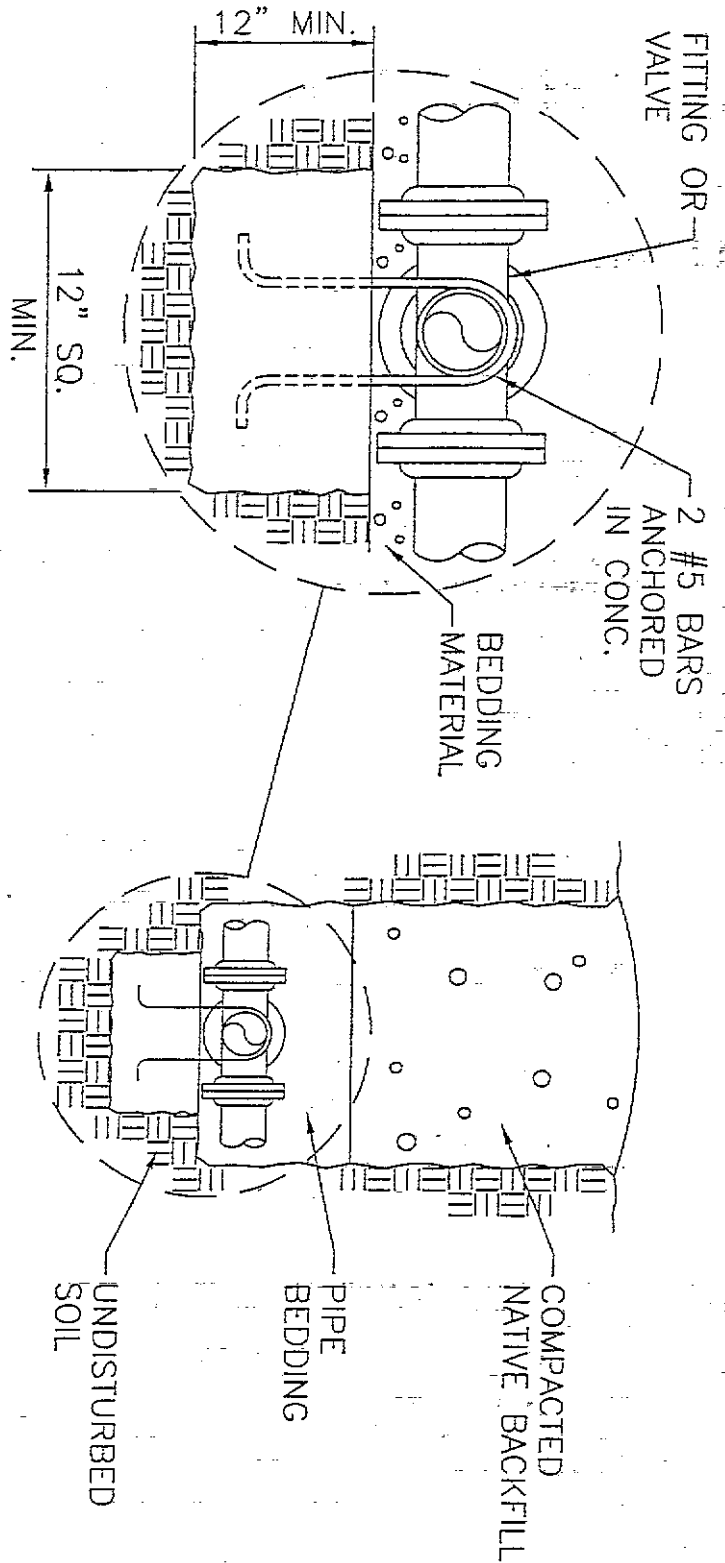
SANTAQUIN CITY CONSTRUCTION STANDARDS

TRENCH DETAIL

DATE
DRAWN BY
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SCALE
PROJECT NAME & NUMBER

N-4

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FILE: SART NWSTAH WTR050



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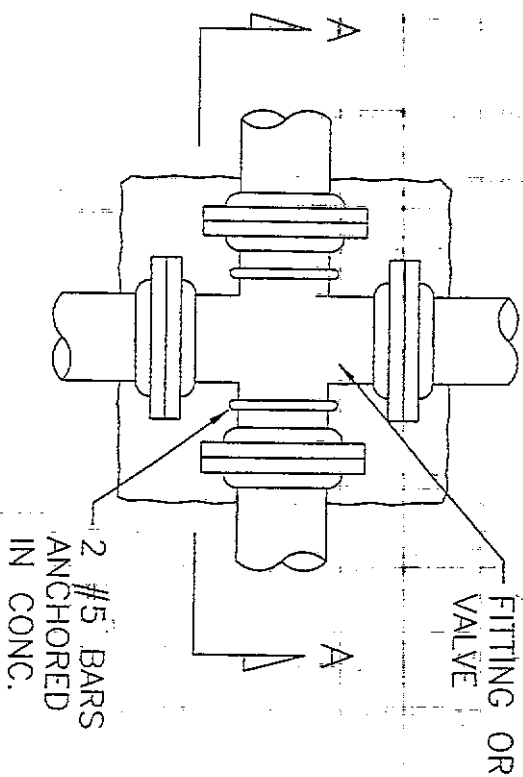
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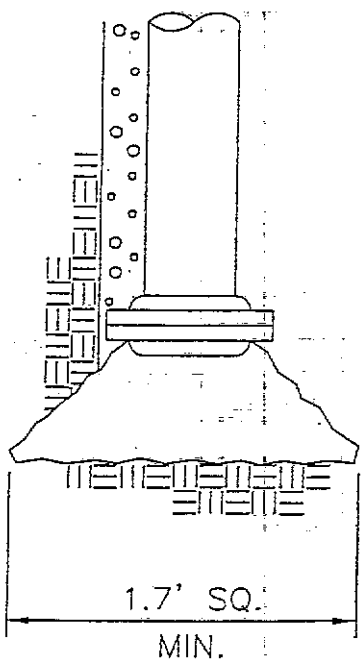
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RESTRAINING SYSTEM DETAILS

THRUST BLOCK



PLAN - THRUST BLOCK



DETAIL - DEAD END THRUST BLOCK

THRUST BLOCK

SANTAQUIN CITY CONSTRUCTION STANDARDS

DESIGN
DRAWN BY
DATE
SCALE
PERSONS D.K. & NAME

16	-	-	-	-	-	-	7.1	15.1	33.5
18	-	-	-	-	-	-	-	8.0	26.3
20	-	-	-	-	-	-	-	-	18.4

NOTES:

1. ALL THRUST BLOCK BEARING FACES SHALL BE PLACED AGAINST UNDISTURBED SOIL OR APPROVED COMPACTED BACKFILL.
2. SQUARE ALL EDGES TO RECEIVE CONCRETE.
3. CONCRETE SHALL BE CLASS C.
4. CALCULATED ON 200 PSI TEST PRESSURE AND ALLOWABLE BEARING PRESSURE OF 1500 LBS. PER SQ. FT.
5. WHEN POORER SOIL CONDITIONS ARISE SPECIAL DESIGN WILL BE REQUIRED.
6. ALL FITTINGS AND VALVES SHALL BE ANCHORED WITH TWO #5 REBAR. ONLY ONE REQ'D FOR REDUCER
7. CENTER ALL FITTINGS OVER THRUST BLOCKS.

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THRUST BLOCK BEARING AREA IN SQ. FT.

PIPE SIZE	CROSS	TEE	WYE	DEAD END	VALVE	90° BEND	45° BEND	22.5° BEND	11.25° BEND
4	2.4	1.7	1.7	1.7	-	2.4	1.3	1.0	1.0
6	5.4	3.8	3.8	3.8	-	5.4	2.9	1.5	1.0
8	9.6	6.8	6.8	6.8	-	9.6	5.2	2.7	1.4
10	15.0	10.6	10.6	10.6	-	15.0	8.1	4.2	2.1
12	21.5	15.2	15.2	15.2	15.2	21.5	11.7	6.0	3.0
14	29.3	20.7	20.7	20.7	20.7	29.3	15.9	8.1	4.1
16	38.2	27.0	27.0	27.0	27.0	38.2	20.7	10.6	5.3
18	48.4	34.2	34.2	34.2	34.2	48.4	26.2	13.4	6.7
20	59.7	42.2	42.2	42.2	42.2	59.7	32.3	16.5	8.3
24	85.9	60.8	60.8	60.8	60.8	85.9	46.5	23.7	11.9

REDUCER

D2 \ D1	6	8	10	12	14	16	18	20	24
4	2.1	5.1	8.8	13.4	-	-	-	-	-
6	-	3.0	6.7	11.3	16.8	23.1	-	-	-
8	-	-	3.8	8.4	13.8	20.1	27.2	-	-
10	-	-	-	4.6	10.1	16.3	23.5	31.4	-
12	-	-	-	-	5.5	11.7	18.8	26.8	45.2

SANTAQUIN CITY
CONSTRUCTION STANDARDS

THRUST BLOCK

W-16

DESIGN
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SCALE
APPROVED DATE & NAME

11.25	4/1	5/2	7/2	9/3	10/3	12/4	13/4	15/5	16/5	19/6
22.5	8/3	11/4	15/5	17/6	21/7	24/8	27/9	30/9	33/10	38/12
45	16/5	23/8	30/10	36/12	43/14	49/16	56/18	62/20	68/21	79/25

CALCULATIONS BASED ON THE ELEVATION OF THE PIPE REMAINING CONSTANT WITH THE CONTOUR OF THE GROUND.

DIP VERTICAL BEND RESTRAINED LENGTHS IN FT.
(L₁ -- BEFORE CONNECTION / L₂ -- AFTER CONNECTION)

BEND ANGLE	PIPE SIZE									
	4	6	8	10	12	14	16	18	20	24
11.25	2/1	4/2	5/2	6/2	7/3	8/3	8/4	9/4	10/4	12/5
22.5	5/2	7/3	9/4	11/5	13/6	15/6	17/7	19/8	21/9	24/10
45	11/5	15/6	20/8	23/10	28/12	32/13	36/15	40/17	43/18	51/21

CALCULATIONS BASED ON THE ELEVATION OF THE PIPE REMAINING CONSTANT WITH THE CONTOUR OF THE GROUND.

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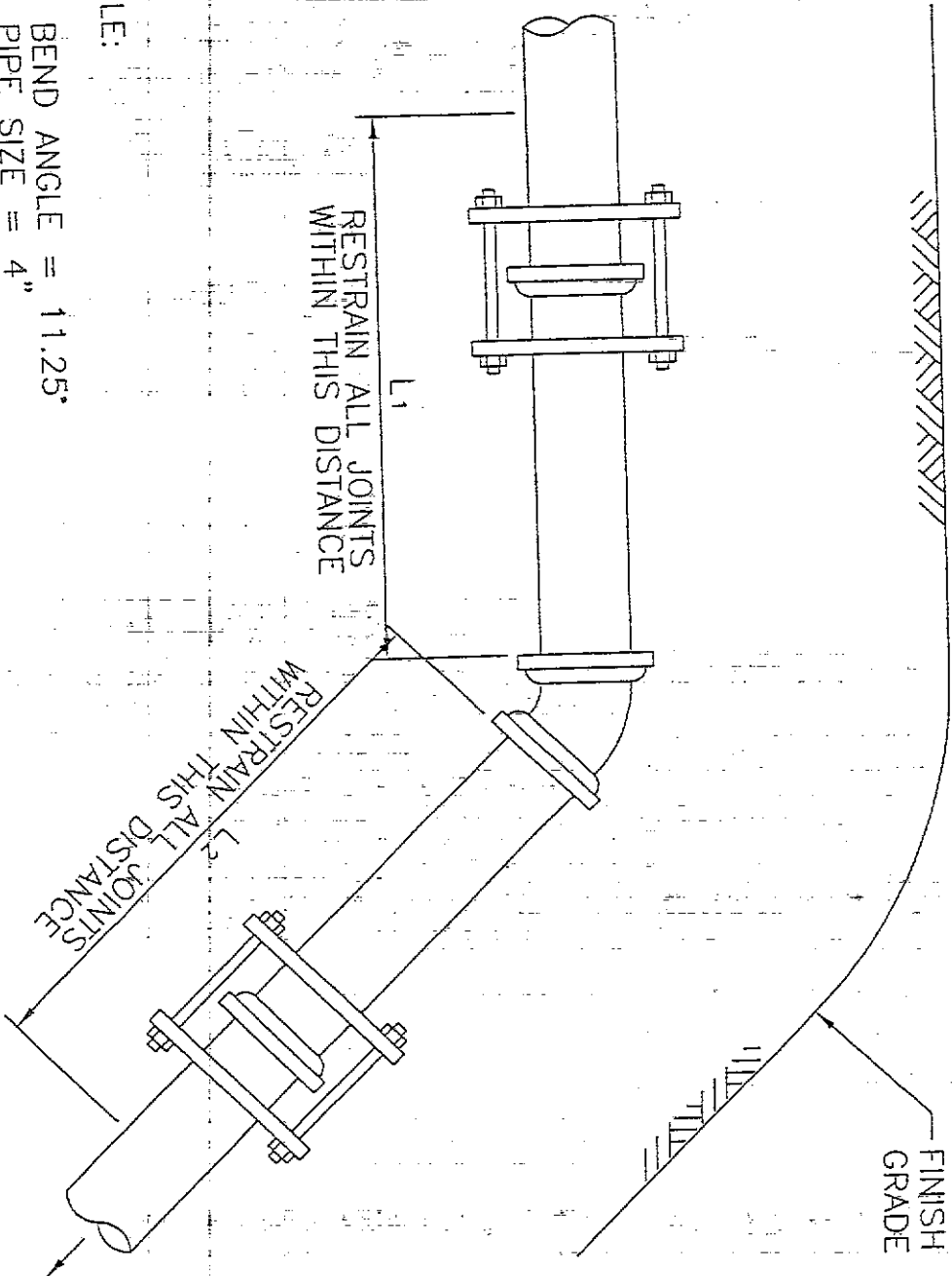
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EXAMPLE:

GIVEN: BEND ANGLE = 11.25°

PIPE SIZE = 4"

PIPE TYPE = PVC

L1 = 4'

L2 = 1'

ELEVATION

PVC VERTICAL BEND RESTRAINED LENGTHS IN FT.
 (L₁ - BEFORE CONNECTION/L₂ - AFTER CONNECTION)

BEND

PIPE SIZE

SANTAQUIN CITY CONSTRUCTION STANDARDS

W-8

DATE
DRAWN BY
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REVISIONS

TEST PRESSURE: 200 PSI

SOIL TYPE: GM - SILTY GRAVEL, GRAVEL-SAND-SILT MIXTURE

BURIAL DEPTH: 4 FT.

TRENCH TYPE: 5 - PIPE BEDDED IN COMPACTED GRANULAR

MATERIAL TO THE CENTER LINE OF PIPE, 4"
MIN. UNDER PIPE. COMPACTED GRANULAR OR
SELECT MATERIAL TO TOP OF PIPE. (APPROX.
90% STANDARD PROCTOR, AASHTO T-99)

SAFETY FACTOR: 1.5

* CALCULATIONS DERIVED FROM EBAA IRON SALES



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RESTRAINING SYSTEM DETAILS

MEGALUG

SANTAQUIN CITY
CONSTRUCTION STANDARDS

MEGALUG

W-7

DATE
DRAWN BY
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SCALE
REVISION DATE & NUMBER

22.5	3	4	5	6	7	8	9	9	10	12
45	5	8	10	12	14	16	18	20	21	25
90	13	18	24	29	34	38	43	47	52	60

NOTES:

1. ALL JOINTS WITHIN THE "L" DISTANCE SHALL BE RESTRAINED

DIP HORIZONTAL BEND RESTRAINED LENGTHS IN FT.

BEND ANGLE	PIPE SIZE									
	4	6	8	10	12	14	16	18	20	24
11.25	1	2	2	2	3	3	4	4	4	5
22.5	2	3	4	5	6	6	7	8	9	10
45	5	6	8	10	12	13	15	17	18	21
90	11	15	20	24	28	32	36	40	44	51

NOTES:

1. ALL JOINTS WITHIN THE "L" DISTANCE SHALL BE RESTRAINED

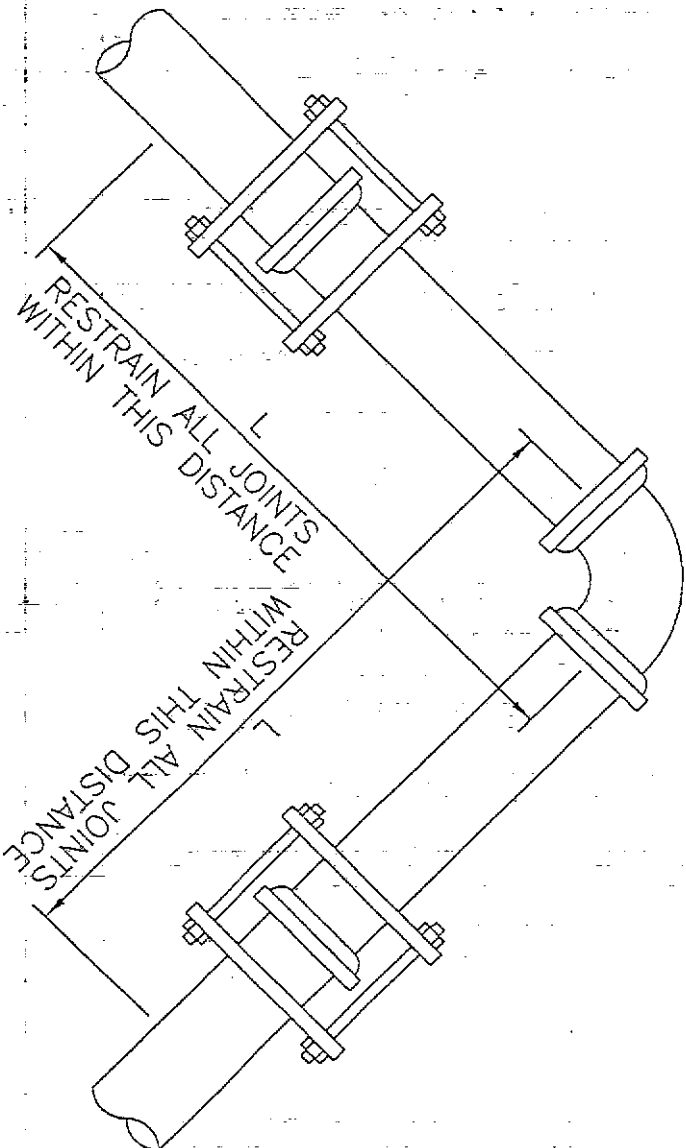
PROJ: 102458:2000 PG 388 OF 480



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EXAMPLE:

GIVEN: BEND ANGLE = 45°
 PIPE SIZE = 6"
 PIPE TYPE = PVC
 L = 8'

PLAN

PVC HORIZONTAL BEND RESTRAINED LENGTHS IN FT.

BEND ANGLE	PIPE SIZE
4	
6	
8	
10	
12	
14	
16	
18	
20	
22	

SANTAQUIN CITY CONSTRUCTION STANDARDS

DESIGN
DRAWN BY
DATE
SCALE
PROJECT DATE & NUMBER

W-9

1. RESTRAIN THE THREE MECHANICAL JOINTS ON THE TEE.
2. ALL JOINTS WITHIN THE "L" DISTANCE ON THE BRANCH SIDE OF TEE SHALL BE RESTRAINED AND ALL JOINTS WITHIN 20' ON THE RUN SIDE OF THE TEE SHALL BE RESTRAINED.

DIP TEE RESTRAINED LENGTHS IN FT.

BRANCH SIZE DIA.	RUN SIZE DIAMETER											
	4	6	8	10	12	14	16	18	20	24		
4	*	*	*	*	*	*	*	*	*	*	*	*
6	-	*	*	*	*	*	*	*	*	*	*	*
8	-	-	*	*	*	*	*	*	*	*	*	*
10	-	-	-	*	*	*	*	*	*	*	*	*
12	-	-	-	-	*	*	*	*	*	*	*	*
14	-	-	-	-	-	*	*	*	*	*	*	*
16	-	-	-	-	-	-	12	2	*	*	*	*
18	-	-	-	-	-	-	-	21	12	*	*	*
20	-	-	-	-	-	-	-	-	30	12	*	*
24	-	-	-	-	-	-	-	-	-	-	47	*

* = FOR THIS CONDITION NEED ONLY RESTRAIN THE OUTLETS OF TEE

NOTES:

1. RESTRAIN THE THREE MECHANICAL JOINTS ON THE TEE.
2. ALL JOINTS WITHIN THE "L" DISTANCE ON THE BRANCH SIDE OF TEE SHALL BE RESTRAINED AND ALL JOINTS WITHIN 18' ON THE RUN SIDE OF THE TEE SHALL BE RESTRAINED.

FILE: 1305 HWY 63 STA 1400.00

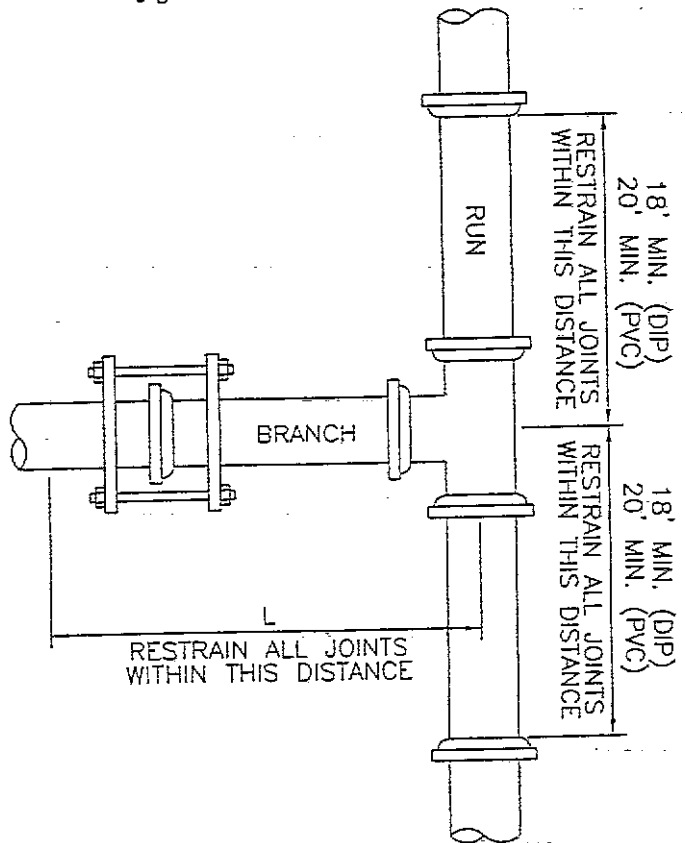


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EXAMPLE:
 PIPE TYPE = DIP
 PIPE SIZE = 16"
 L = 12'



PLAN

PVC TEE RESTRAINED LENGTHS IN FT.

BRANCH SIZE DIA.	RUN SIZE DIAMETER										
	4	6	8	10	12	14	16	18	20	24	
4	*	*	*	*	*	*	*	*	*	*	
6	--	*	*	*	*	*	*	*	*	*	
8	--	--	*	*	*	*	*	*	*	*	
10	--	--	--	*	*	*	*	*	*	*	
12	--	--	--	--	*	*	*	*	*	*	
14	--	--	--	--	--	*	*	*	*	*	
16	--	--	--	--	--	--	7	*	*	*	
18	--	--	--	--	--	--	--	20	4	*	
20	--	--	--	--	--	--	--	--	34	3	
24	--	--	--	--	--	--	--	--	--	60	

* = FOR THIS CONDITION NEED ONLY RESTRAIN THE OUTLETS OF TEE

SANTAQUIN CITY CONSTRUCTION STANDARDS

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SCALE
REVISION DATE & NUMBER

W-10

MEGALUG

20 - - - - - 70/57

NOTES:

1. ALL JOINTS WITHIN THE "L" DISTANCE SHALL BE RESTRAINED

DIP REDUCER RESTRAINED LENGTHS IN FT.
(SMALL SIDE/LARGE SIDE)

D2/D1	6	8	10	12	14	16	18	20	24
4	27/18	65/34	110/46	166/58	-	-	-	-	-
6	-	26/20	57/35	95/48	140/61	192/73	-	-	-
8	-	-	24/19	53/35	87/50	127/63	171/75	-	-
10	-	-	-	23/20	51/36	82/51	118/64	158/77	-
12	-	-	-	-	23/20	49/37	79/52	112/66	188/91
14	-	-	-	-	-	22/20	48/37	76/52	141/80
16	-	-	-	-	-	-	22/19	47/37	103/67
18	-	-	-	-	-	-	-	22/19	72/53
20	-	-	-	-	-	-	-	-	45/37

NOTES:

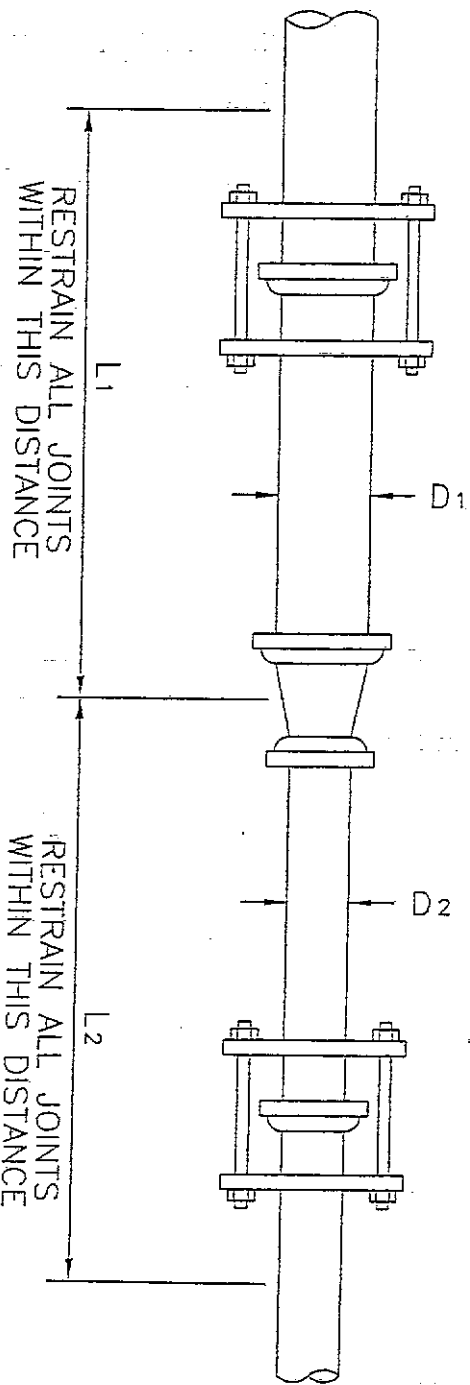
1. ALL JOINTS WITHIN THE "L" DISTANCE SHALL BE RESTRAINED



Santiquin City

45 west 100 south
Santiquin Utah, 84655

PREPARED BY SUNRISE ENGINEERING



EXAMPLE:

PIPE TYPE = PVC

D1 = 8"

D2 = 6"

L1 = 31'

L2 = 40'

PVC REDUCER RESTRAINED LENGTHS IN FT.
(SMALL SIDE/LARGE SIDE)

D2 \ D1	6	8	10	12	14	16	18	20	24
4	42/29	100/52	171/71	258/90	-	-	-	-	-
6	-	40/31	88/54	147/75	217/95	297/113	-	-	-
8	-	-	37/29	82/55	135/77	197/98	266/117	-	-
10	-	-	-	36/30	79/56	128/80	183/100	244/120	-
12	-	-	-	-	36/30	77/57	123/80	174/102	293/142
14	-	-	-	-	-	35/30	74/57	118/81	219/124
16	-	-	-	-	-	-	34/30	73/57	161/104

SANTAQUIN CITY
CONSTRUCTION STANDARDS

MEGALUG

W-11

DESIGN
DRAWN BY
DATE
SCALE
REVISION DATE & MADE BY

PIPE SIZE									
4	6	8	10	12	14	16	18	20	24
39	55	73	88	104	119	134	149	163	192

NOTES:

1. ALL JOINTS WITHIN THE "L" DISTANCE SHALL BE RESTRAINED

DIP DEAD END RESTRAINED LENGTHS IN FT.

PIPE SIZE									
4	6	8	10	12	14	16	18	20	24
25	36	47	57	67	76	86	95	105	123

NOTES:

1. ALL JOINTS WITHIN THE "L" DISTANCE SHALL BE RESTRAINED

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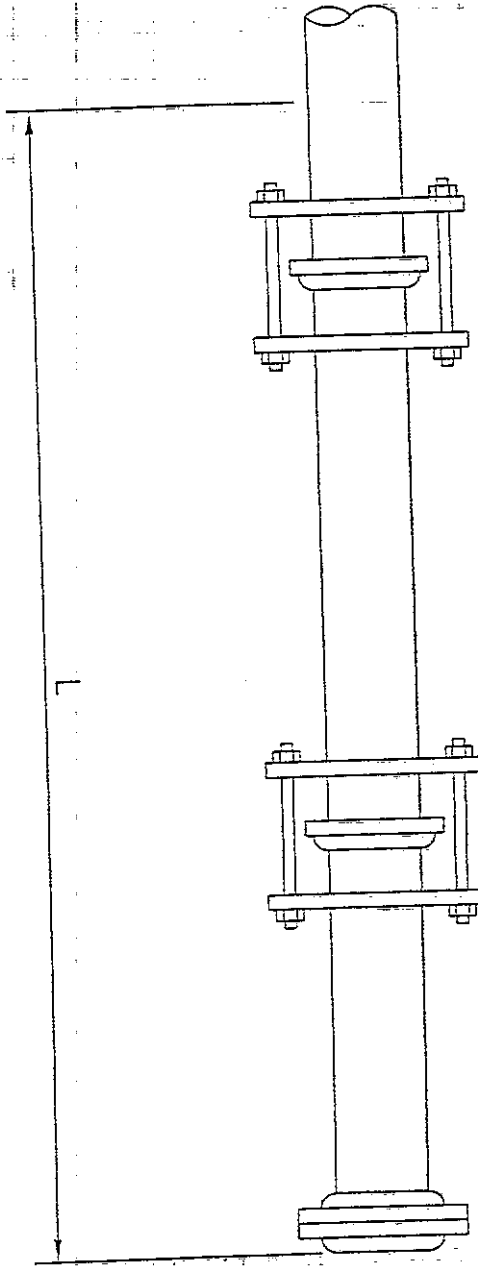
Santaquin Utah , 84655

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EXAMPLE:

PIPE TYPE = DIP
PIPE SIZE = 10"
L = 57'



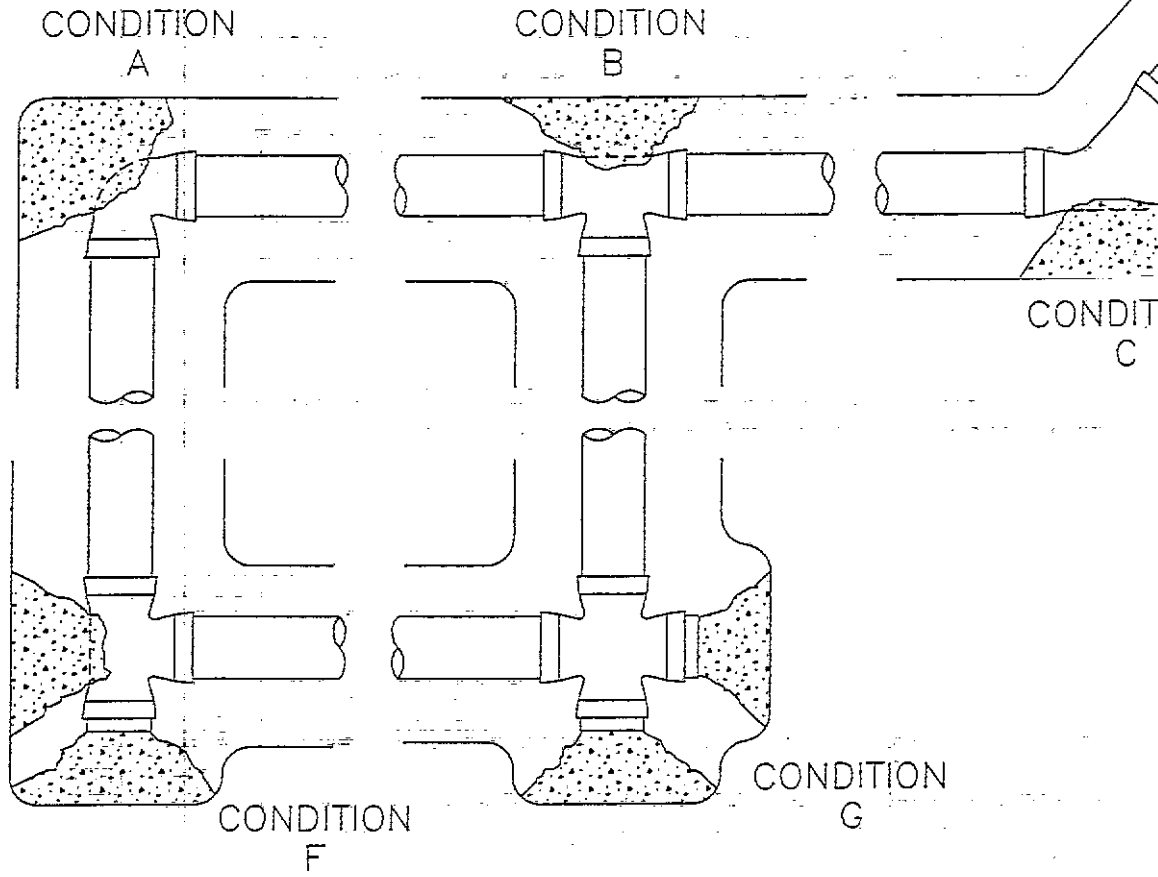
PVC DRAIN END RESTRAINED LENGTHS IN FT.

SANTAQUIN CITY CONSTRUCTION STANDARDS

MEGALUG

W-12

DESIGN
DRAWN BY
CHECK
SCALE
APPROVED DATE & NUMBER



THRUST BLOCK BEARING AREA IN SQUARE FEET								
PIPE SIZE	CONDITION							
	A	B	C	D	E	F	G	H
4	3.3	2.6	2.6	1.3	1.3	2.0	3.3	2.6
6	6.5	4.6	3.9	2.0	2.6	3.3	6.5	4.6
8	11.0	7.8	5.9	3.3	3.9	5.9	11.0	7.8
10	17.5	12.4	9.8	5.2	6.5	9.1	17.5	12.4
12	24.8	17.5	13.6	7.8	9.1	12.3	24.8	17.5
14	33.8	24.0	18.2	9.7	12.3	16.9	33.8	24.0
16	44.0	31.1	23.8	12.7	15.6	23.2	44.0	31.1

FILE: SANT INYETAN TURBOKI

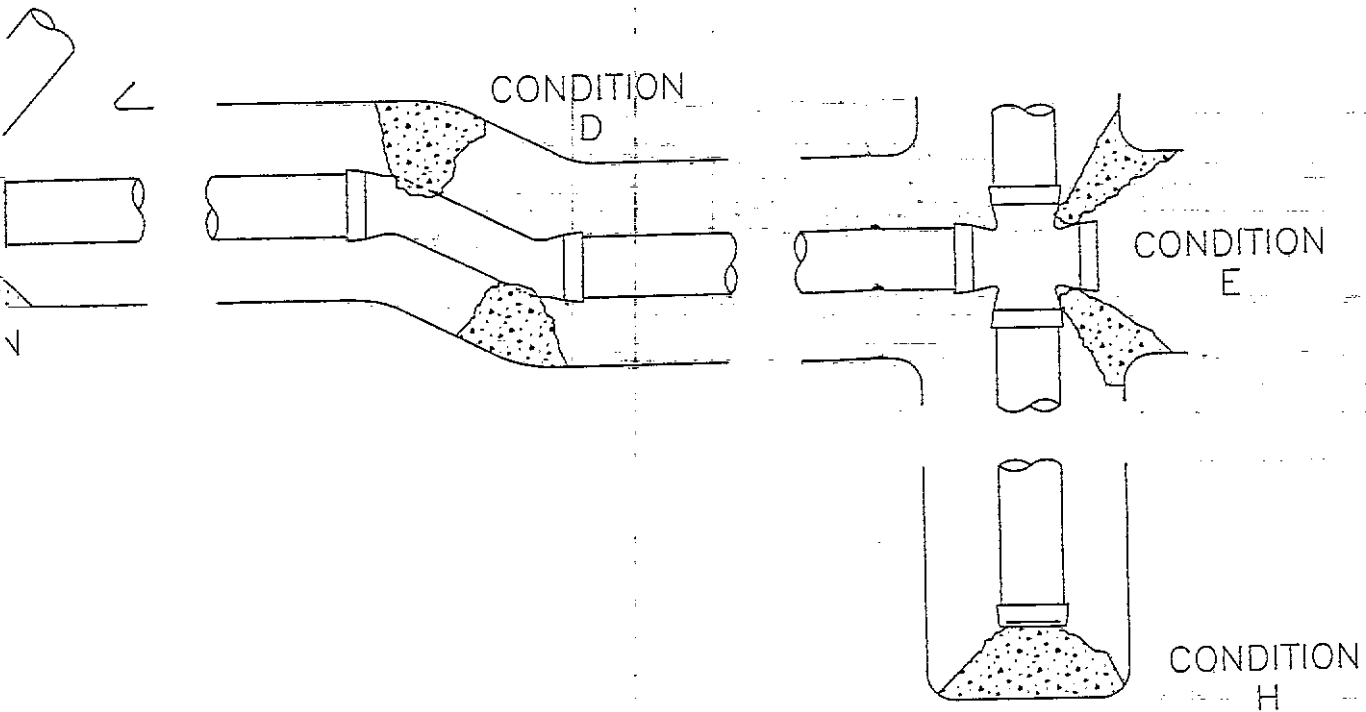


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NOTES:

1. ALL THRUST BLOCK BEARING FACES SHALL BE Poured AGAINST UNDISTURBED SOIL OR APPROVED COMPACTED BACKFILL
2. CONCRETE SHALL BE CLASS 564-C-3000
3. THRUST BLOCKS SHALL NOT INTERFERE WITH ACCESS TO THE JOINT
4. ALL BOLTS ON MECHANICAL JOINT FITTINGS SHALL BE FREE FROM CONCRETE AND FULLY ACCESSIBLE
5. ALL FITTINGS TO BE WRAPPED IN PLASTIC SHEETING.

SANTAQUIN CITY CONSTRUCTION STANDARDS

W-13

THRUSTBLOCK

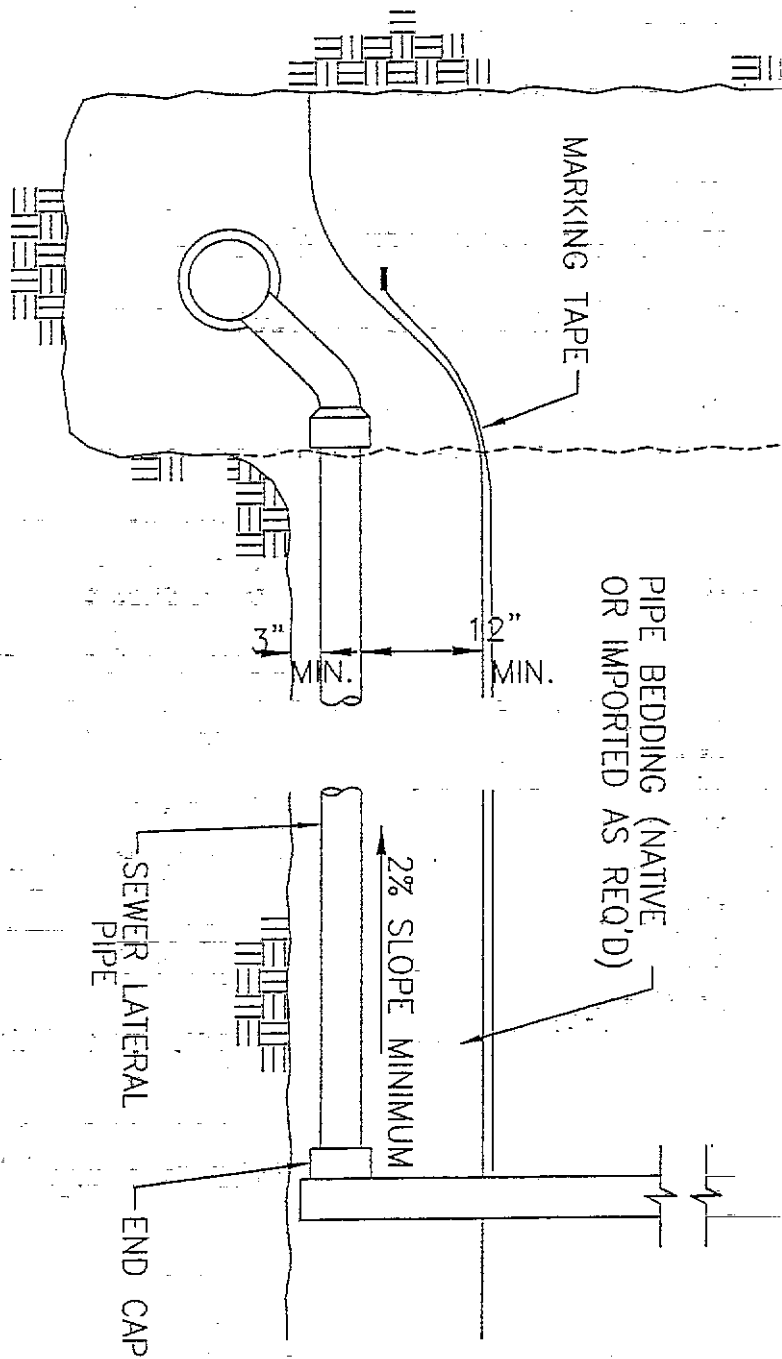
DESIGN
DRAWN BY
DATE
SCALE
REVISION DATE & NUMBER

ENT 102458:2000 PG 398 of 480

Sewer Details

DETAIL - SEWER SERVICE LATERAL
NO SCALE

SECTION A-A



FILE: SANT MWSTAN SWRO1

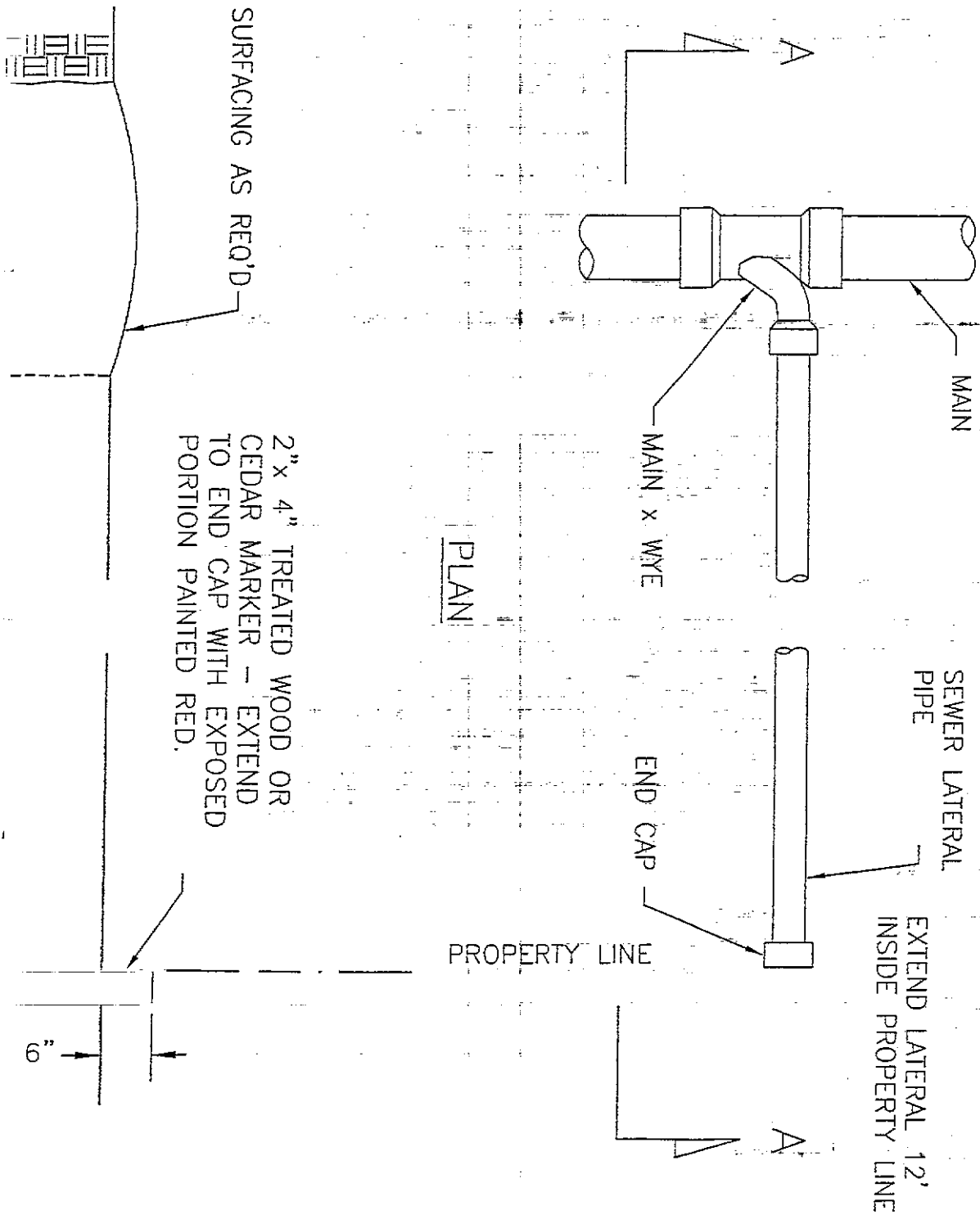


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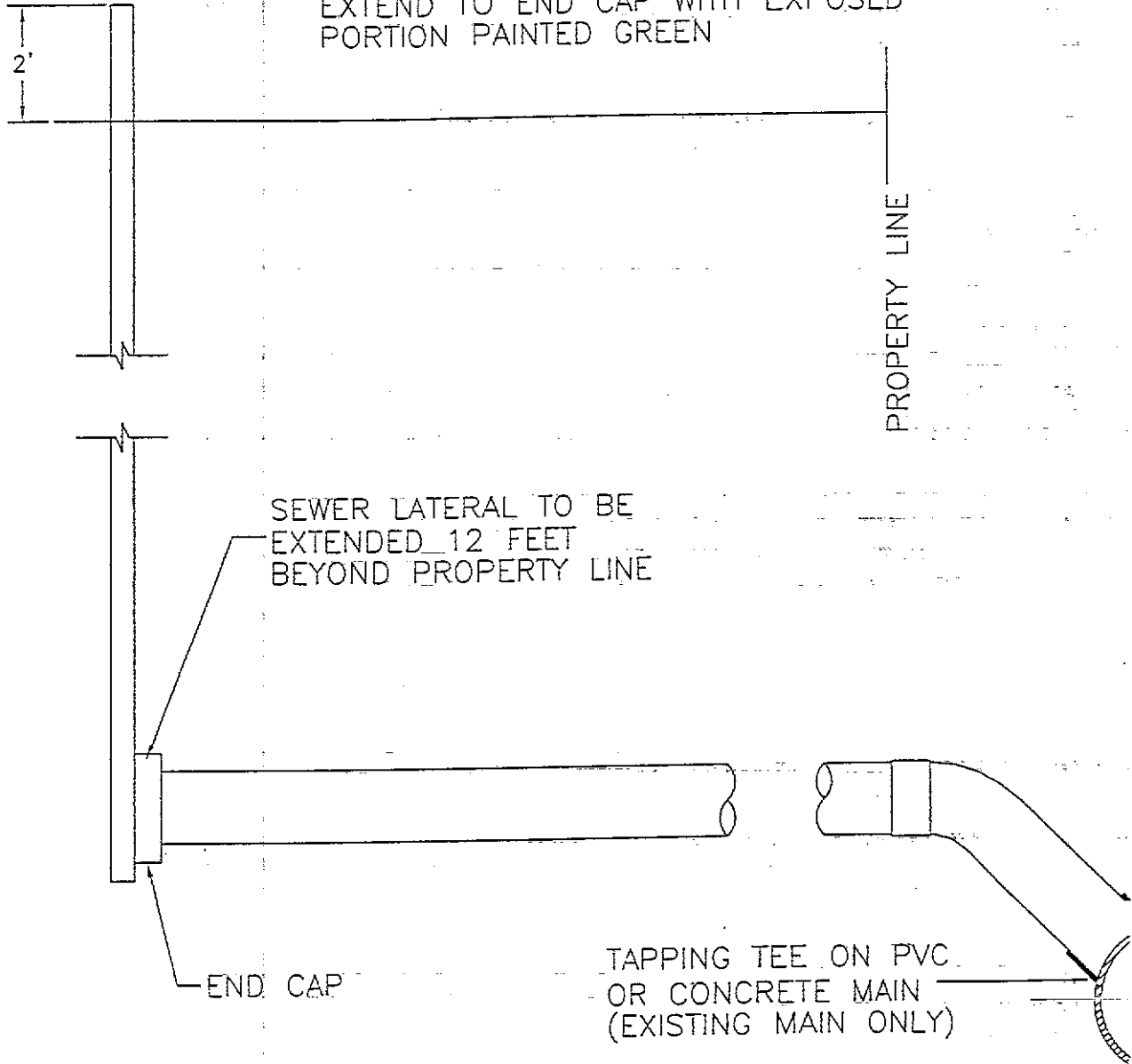


SANTAQUIN CITY CONSTRUCTION STANDARDS

	DATE
	SCALE
	REVISION DATE & NUMBER

S-1

2" X 4" TREATED WOOD MARKER
EXTEND TO END CAP WITH EXPOSED
PORTION PAINTED GREEN



DETAIL — TAPPING
NO SCALE



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Santaquin City

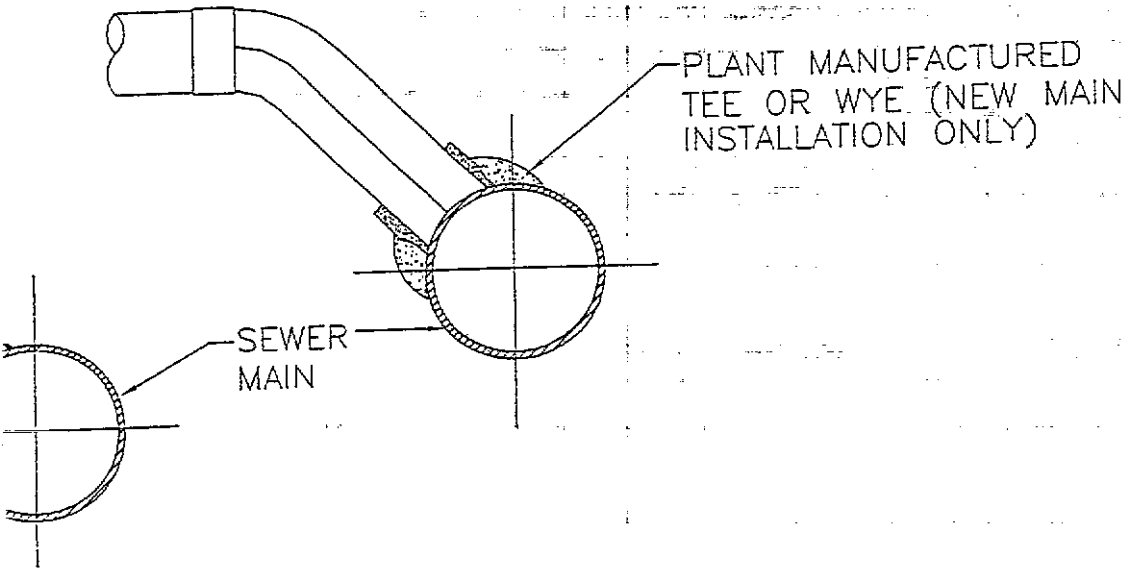
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PREPARED BY SUNRISE ENGINEERING

NOTE:

1. ANY BEND GREATER THAN 22 1/2 SHALL HAVE A CLEAN OUT.
2. MINIMUM SLOPE FOR A 4 INCH LATERAL IS 2%
3. MINIMUM SLOPE FOR A 6 INCH LATERAL IS 1%
4. CONNECTION OF THE NEW SERVICE LATERAL TO THE MAINLINE SHALL BE ACCOMPLISHED BY MEANS OF A COMPRESSION-FIT SERVICE CONNECTION. THE SERVICE CONNECTION SHALL BE SPECIFICALLY DESIGNED FOR CONNECTION TO THE SEWER MAIN BEING INSTALLED. EXAMPLE: INSERTA TEE AS MANUFACTURED BY INSERTA FITTINGS CO., HILLSBORO, OREGON, TELEPHONE (503) 357-2110; FAX (503) 359-5417; OR APPROVED EQUAL. INSTALL USING PROCEDURES AND EQUIPMENT AS REFERENCED IN MANUFACTURER'S WRITTEN INSTALLATION INSTRUCTIONS.



EXISTING MAINS

SANTAQUIN CITY CONSTRUCTION STANDARDS

S-2

SEWER-LATERAL

DESIGN
DRAWN BY
CHECK
SCALE
APPROVED BY A HARBET

PLAN - MANHOLE
NO. SCALE

NOTES:

1. VENTED LIDS SHALL BE REQ'D. IN ALL PAVED STREETS
2. NON-VENTED LIDS SHALL BE REQ'D IN ALL OTHER AREAS
3. WHERE FIELD CONDITIONS PROHIBIT COMBINATION OF PRE-CAST CONC. SECTIONS SHOWN, OTHER COMBINATIONS OF PRECAST CONC. SECTIONS MAY BE USED AS PER ENGINEER'S APPROVAL
4. FOR DROP MANHOLE SEE DWG. NO. B3
5. CONC. PAD REQ'D ON ALL MANHOLES ALONG STREETS AND ROADWAYS. THEY ARE NOT REQ'D IN AREAS WHERE THE NEW SEWER LINE TRAVERSES NATIVE FARMLAND OR WHERE OTHERWISE APPROVED BY THE ENGINEER
6. CONTRACTOR SHALL RESTORE TRENCH SURFACE AS REQ'D PRIOR TO CONSTRUCTING CONCRETE-MANHOLE COLLARS
7. CONTRACTOR SHALL PROVIDE BARRICADES AT EACH MANHOLE FOR 7 DAYS AFTER PLACEMENT OF CONCRETE COLLARS

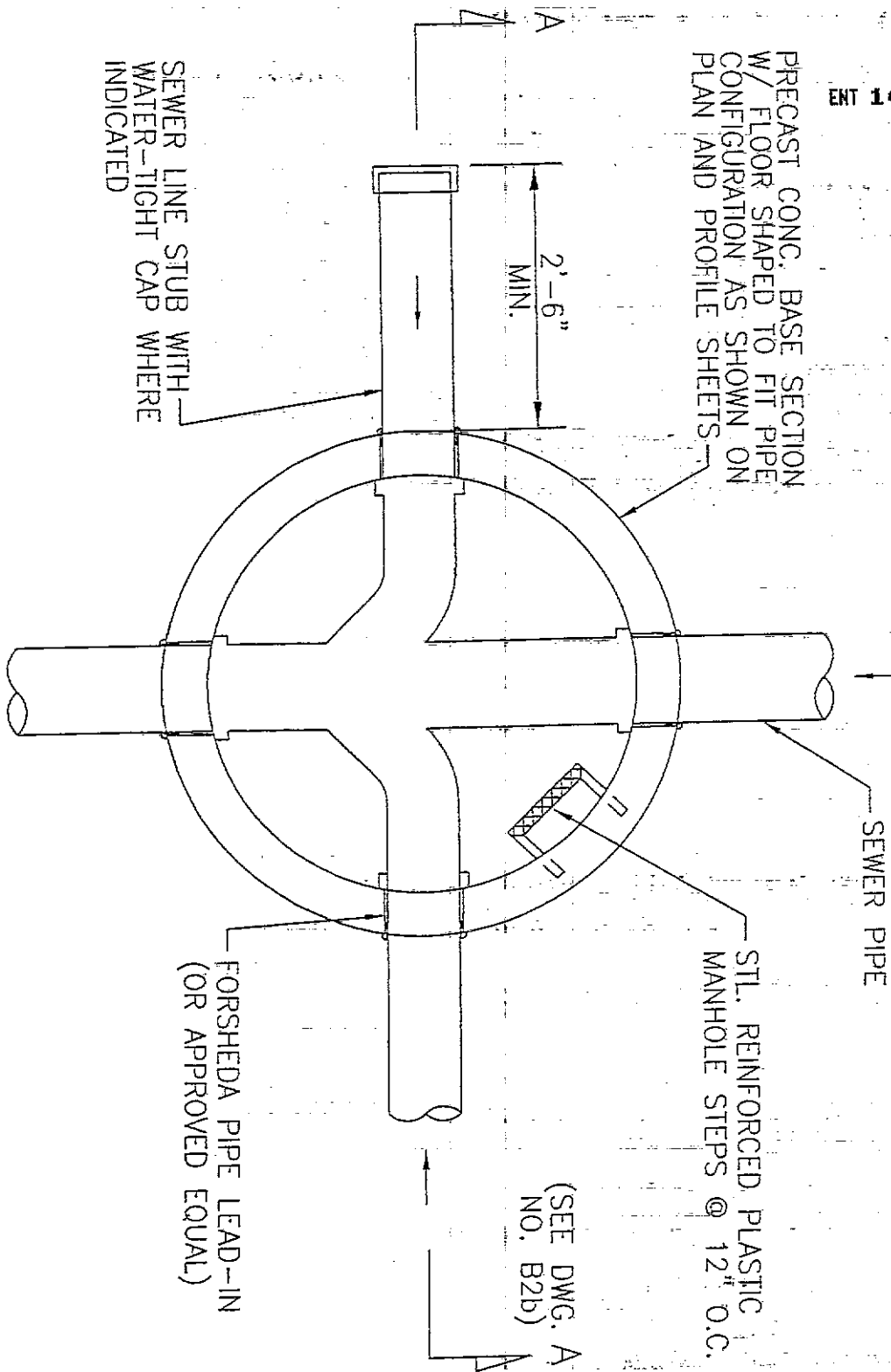


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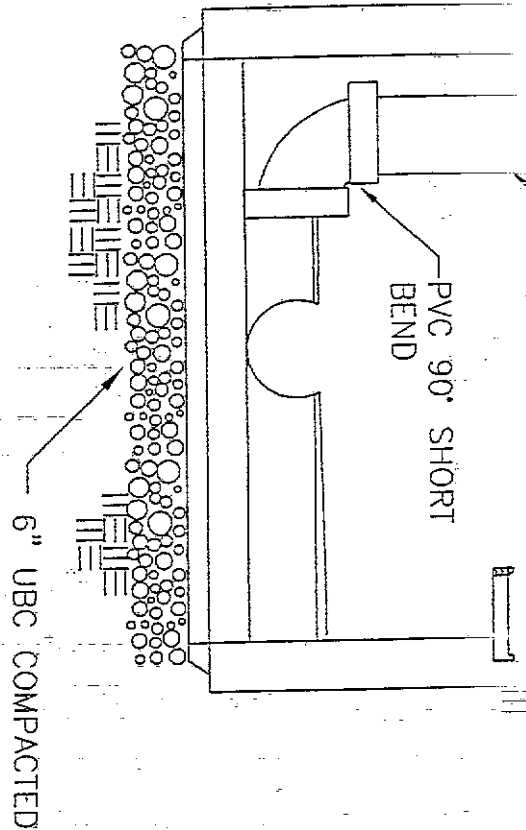


(SEE DWG. A
NO. B2b)

SANTAQUIN CITY CONSTRUCTION STANDARDS

	ECOR
	DRAWN BY
	CHK
	SCALE
	REVISION DATE & NUMBER

ST. STL. U-BOLT,
FLAT WASHERS, LOCK
WASHERS, AND HEX
NUTS. PER
4' PIPE SECTION,
MIN. 2 PER MANHOLE



DETAIL - DROP MANHOLE

NO SCALE FOR 10" AND SMALLER LINES

NOTES:

1. FOR DROP DISTANCES LESS THAN 18" NO DROP MANHOLE SHALL BE USED. THE CONTRACTOR SHALL SLOPE THE TROUGHS IN THE BASE SECTION OF THE MANHOLE TO ACCOMMODATE THE DROP DISTANCES
2. LINES LARGER THAN 10" SHALL BE OUTSIDE DROPS.

FILE: SANTI NWSTAM SWR02b



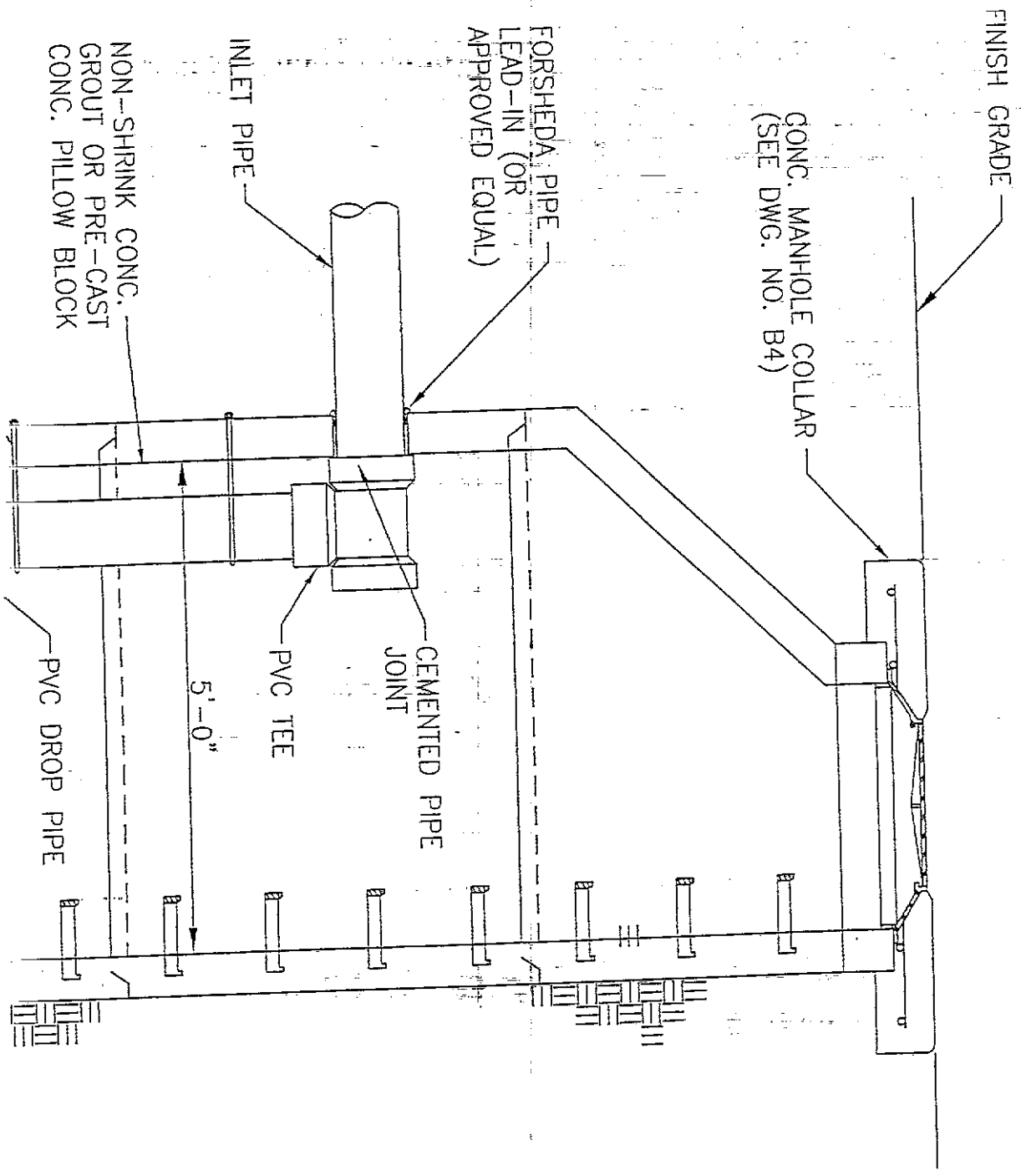
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SANTAQUIN CITY CONSTRUCTION STANDARDS

SEWER-MANHOLE

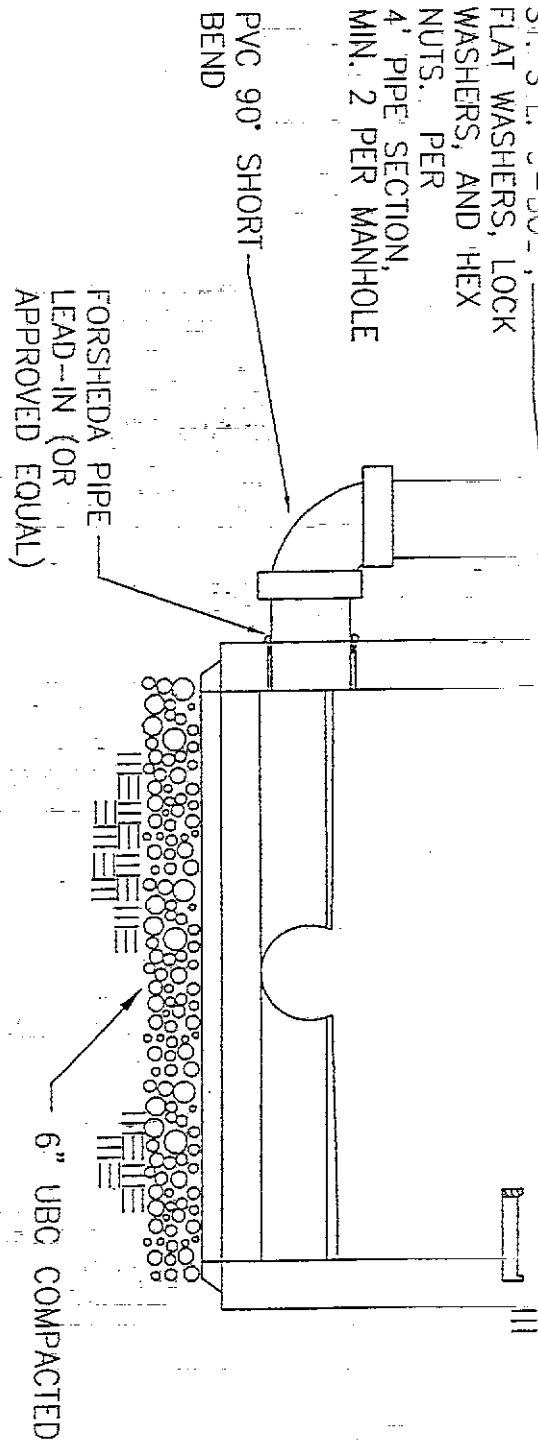
S-4

DESIGN
DRAWN BY
CHECK
SCALE
REVISION DATE & NUMBER

FLAT WASHERS, LOCK WASHERS, AND HEX NUTS. PER 4' PIPE SECTION, MIN. 2 PER MANHOLE

PVC 90° SHORT BEND

FORSHEDA PIPE LEAD-IN (OR APPROVED EQUAL)



DETAIL - DROP MANHOLE

NO SCALE FOR LINES LARGER THAN 10"

NOTES:

1. FOR DROP DISTANCES LESS THAN 18" NO DROP MANHOLE SHALL BE USED. THE CONTRACTOR SHALL SLOPE THE TROUGHS IN THE BASE SECTION OF THE MANHOLE TO ACCOMMODATE THE DROP DISTANCES
2. LINES 10" AND SMALLER SHALL BE INSIDE DROPS

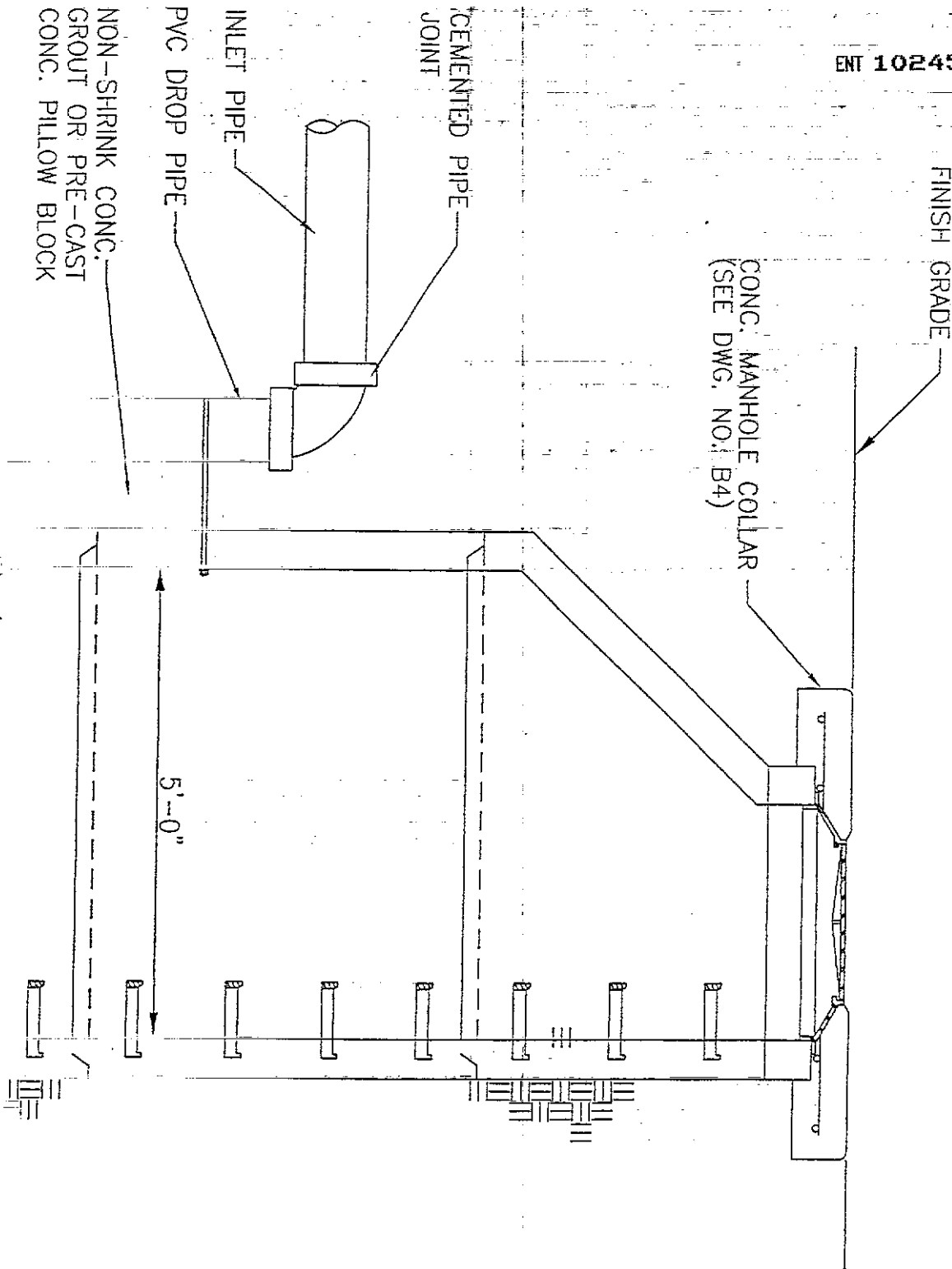
FILE: SAINT EWISTAN SWIR02c



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PREPARED BY SUNRISE ENGINEERING



SANTAQUIN CITY CONSTRUCTION STANDARDS

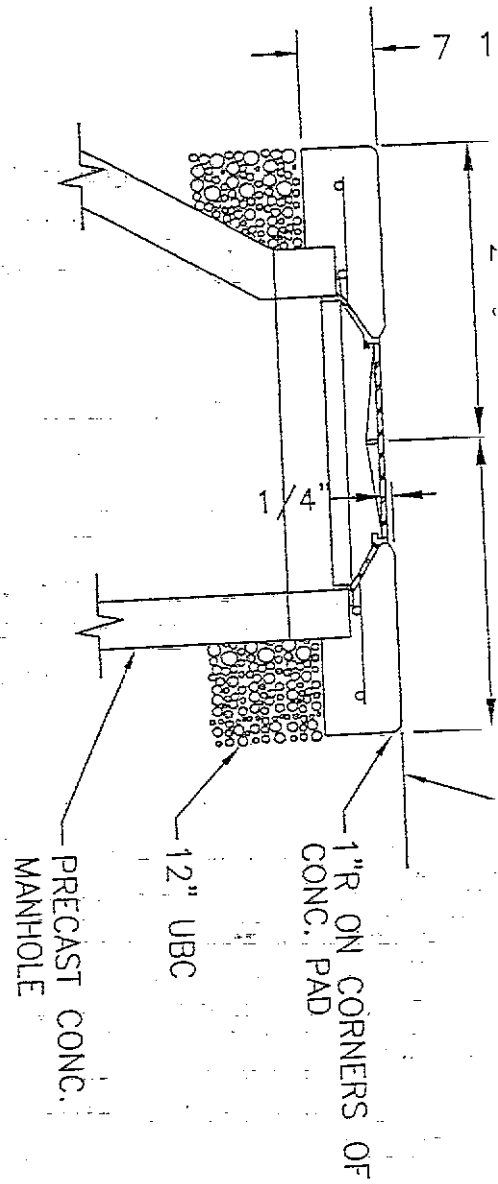
SEWER-MANHOLE

S-5

SECTION
DRAWN BY
DATE
SCALE
PROJECT DATE & NUMBER

DETAIL -- CONCRETE MANHOLE COLLAR
NO SCALE

SECTION A-A



FILE: SANT ANSTAN SWRO3



Santaquin City

Santaquin City

45 west 100 south

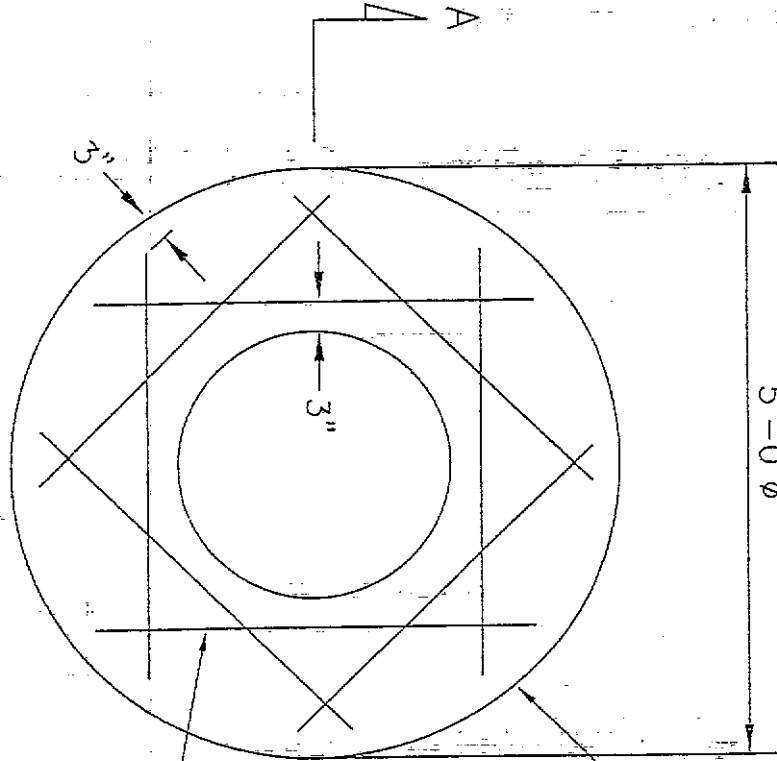
Santaquin Utah , 84655

PREPARED BY SUNRISE ENGINEERING

2"

5'-0" ϕ

PLAN



5'-0" ϕ

3"

#5 BARS
(8 PLACES TYP.)

7 1/2" THK. CONC.
MANHOLE COLLAR

SANTAQUIN CITY CONSTRUCTION STANDARDS

SEWER

S-6

DESIGN
DRAWN BY
CHECK
SCALE
REVISION DATE & NUMBER

2 1/2" BSC @ 56' & 60'
R/W, 3" BSC @ 86' R/W

SAWCUT

8'-0" MIN.

MARKING TAPE 1"
BELOW FINISHED SURFACE

SEWER PIPE MAIN

DETAIL - TRENCH
NO SCALE

FILE: SANT NWSTAN SWR04



Santiquin City

45 west 100 south

Santiquin Utah, 84655

PREPARED BY SUNRISE ENGINEERING

TH AS REQ'D

6" UBC @ 56' & 66' R/W,
8" UBC @ 86' R/W

SAWCUT

NATIVE TRENCH BACKFILL 95%
COMPACTION W/ VIBRATORY
ROLLER 6" MAX. LIFTS.

PIPE BEDDING 1" MAX. SEGREGATED
NATIVE OR IMPORTED BACKFILL MATE-
RIAL 90% COMPACTION

NOTE:
ADD FLOWABLE BACKFILL
MATERIALS FOR WINTER MONTHS.

H THRU ASPHALT ROAD

SANTAQUIN CITY CONSTRUCTION STANDARDS

S-7

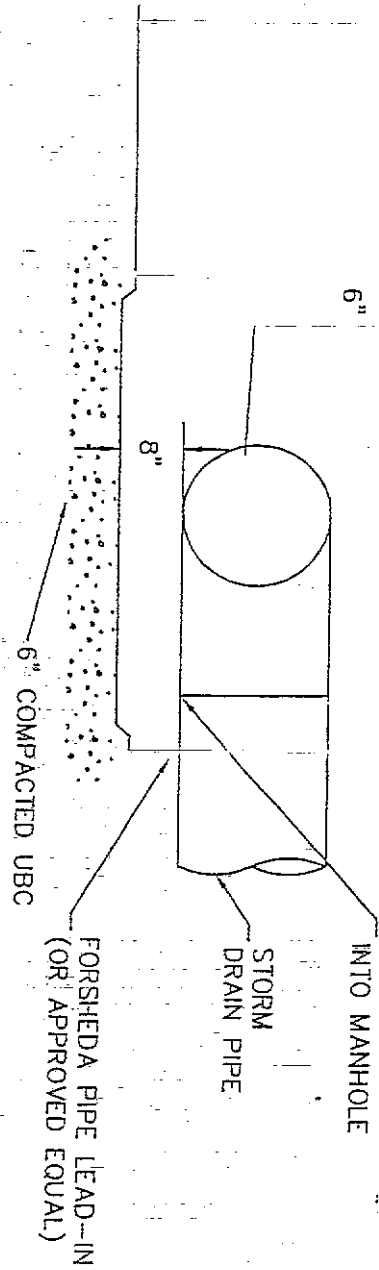
SEWER

DESIGN
DRAWN BY
DATE
SCALE
REVISION DATE & NUMBER

ENT 102458:2000 PG 413 of 480

Storm Drain Details

- NOTES:
1. FLAT LIDS MAY BE USED IN LIEU OF ECCENTRIC CONES WHERE NECESSARY. FLAT LIDS SHALL BE OF ECCENTRIC DESIGN AND MEET H2O LIVE LOADING. NO FLAT RING AND COVERS WILL BE ALLOWED UNLESS APPROVED BY PUBLIC WORKS.
 2. MANHOLE RIMS PLACED IN FIELDS SHALL HAVE SOLID LIDS AND BE BURIED 2 FEET DEEP.
 3. MANHOLE RIMS OUT OF STREETS SHALL BE PLACED 4 INCHES ABOVE GRADE.



SECTION A-A

SECTION - MANHOLE
NO SCALE

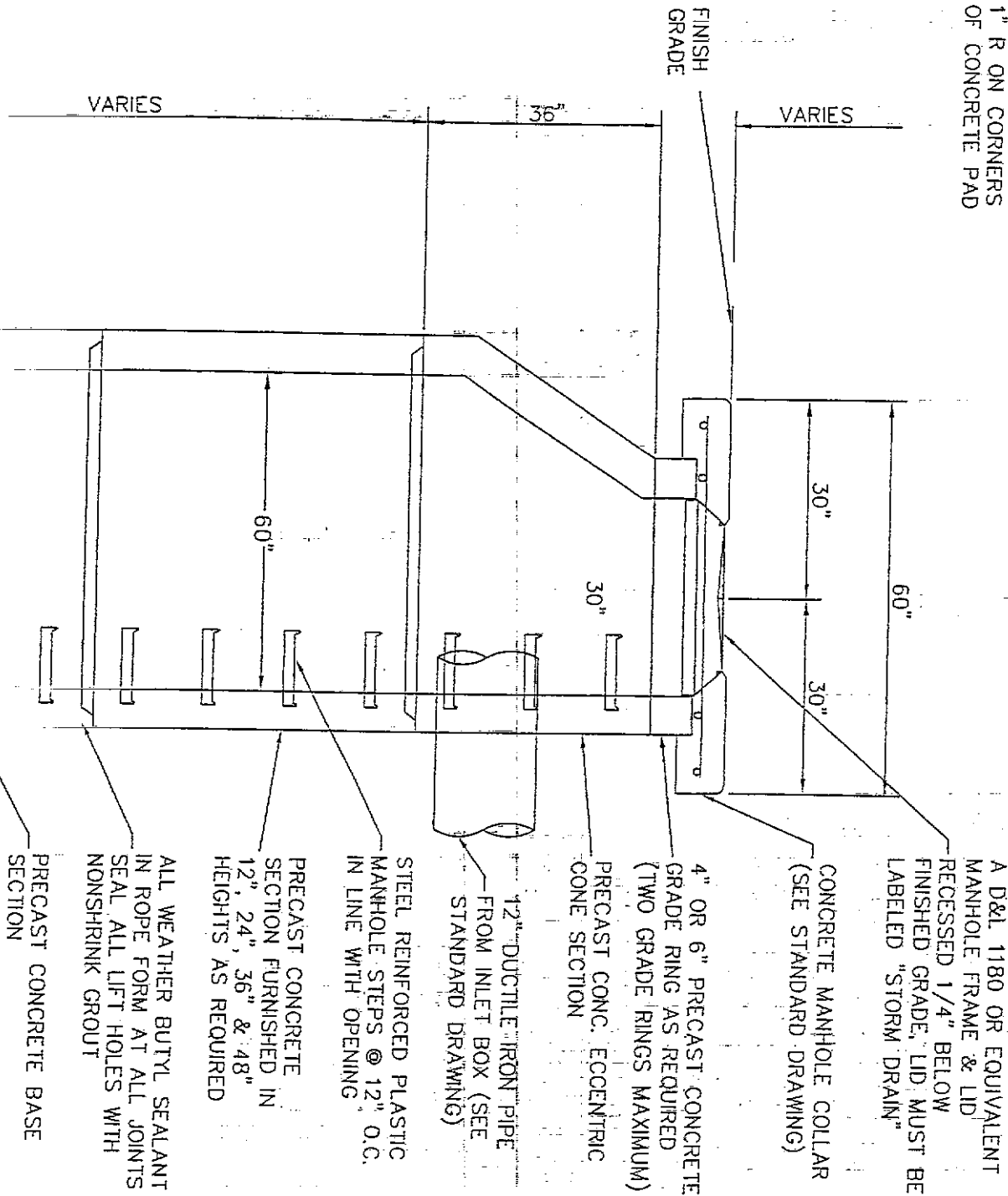
FILE, SAINT NWSTAN SIDORO



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PREPARED BY SUNRISE ENGINEERING



1" R ON CORNERS
OF CONCRETE PAD

A D&L 1180 OR EQUIVALENT
MANHOLE FRAME & LID
RECESSED 1/4" BELOW
FINISHED GRADE. LID MUST BE
LABELED "STORM DRAIN"

CONCRETE MANHOLE COLLAR
(SEE STANDARD DRAWING)

4" OR 6" PRECAST CONCRETE
GRADE RING AS REQUIRED
(TWO GRADE RINGS MAXIMUM)

PRECAST CONC. ECCENTRIC
CONE SECTION

12" DUCTILE IRON PIPE
FROM INLET BOX (SEE
STANDARD DRAWING)

STEEL REINFORCED PLASTIC
MANHOLE STEPS @ 12" O.C.
IN LINE WITH OPENING

PRECAST CONCRETE
SECTION FURNISHED IN
12", 24", 36" & 48"
HEIGHTS AS REQUIRED

ALL WEATHER BUTYL SEALANT
IN ROPE FORM AT ALL JOINTS
SEAL ALL LIFT HOLES WITH
NONSHRINK GROUT

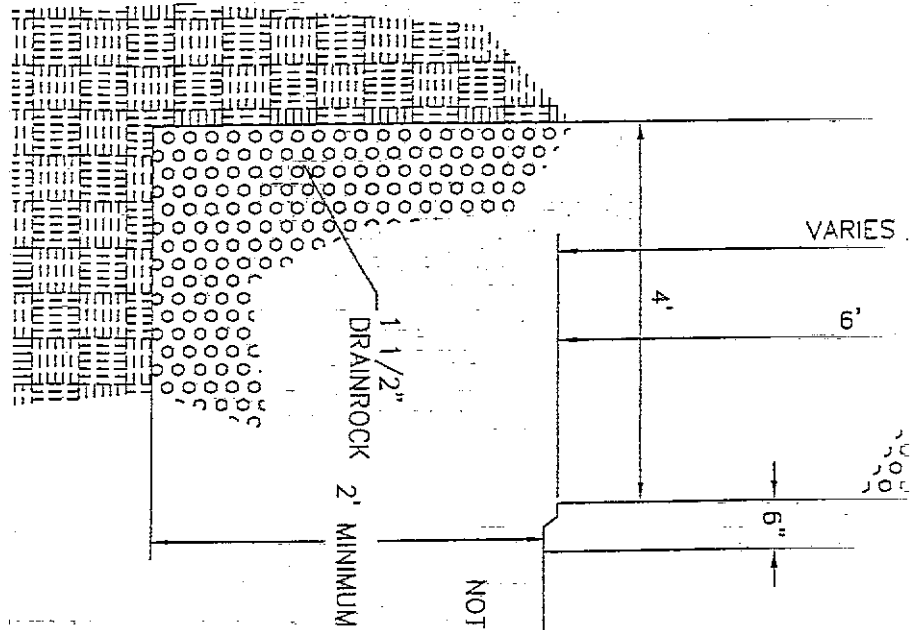
PRECAST CONCRETE BASE
SECTION

SANTAQUIN CITY CONSTRUCTION STANDARDS

STORM DRAIN - MANHOLE

SD-1

DATE
DRAWN BY
SCALE
REVISION DATE & NUMBER



- NOTES:
1. FLAT LIDS MAY BE USED IN LIEU OF ECCENTRIC CONES WHERE NECESSARY. FLAT LIDS SHALL BE OF ECCENTRIC DESIGN AND MEET H2O LIVE LOADING. NO FLAT RING AND COVERS WILL BE ALLOWED UNLESS APPROVED BY PUBLIC WORKS.
 2. MANHOLE RING PLACED IN FIELDS SHALL HAVE SOLID LIDS AND BE BURIED 2 FEET DEEP.
 3. MANHOLE RIMS OUT OF STREETS SHALL BE PLACED 4 INCHES ABOVE GRADE.
 4. THERE SHALL BE NO DIRECT INLET INTO SUMPS. WATER MUST FIRST BE COLLECTED IN IN A CURB FACE DROP INLET BOX WITH OIL AND DEBRIS SEPARATION (SEE STANDARD DRAWING).
 5. ALL SUMPS SHALL BE MADE OF CONCRETE.
 6. THERE SHALL BE A 4' ENVELOPE OF 1 1/2" MINUS GRAVEL AROUND THE BOTTOM 6' OF THE SUMP.
 7. THE BOTTOM SECTION SHALL HAVE 1" TO 1.5" HOLES 12" O.C.
 8. SUMP SHALL BE INSTALLED IN A GRAVEL LAYER.

SECTION - SUMP
NO SCALE

2008.JS.MAYSTAN.LANS FILE: SUMP

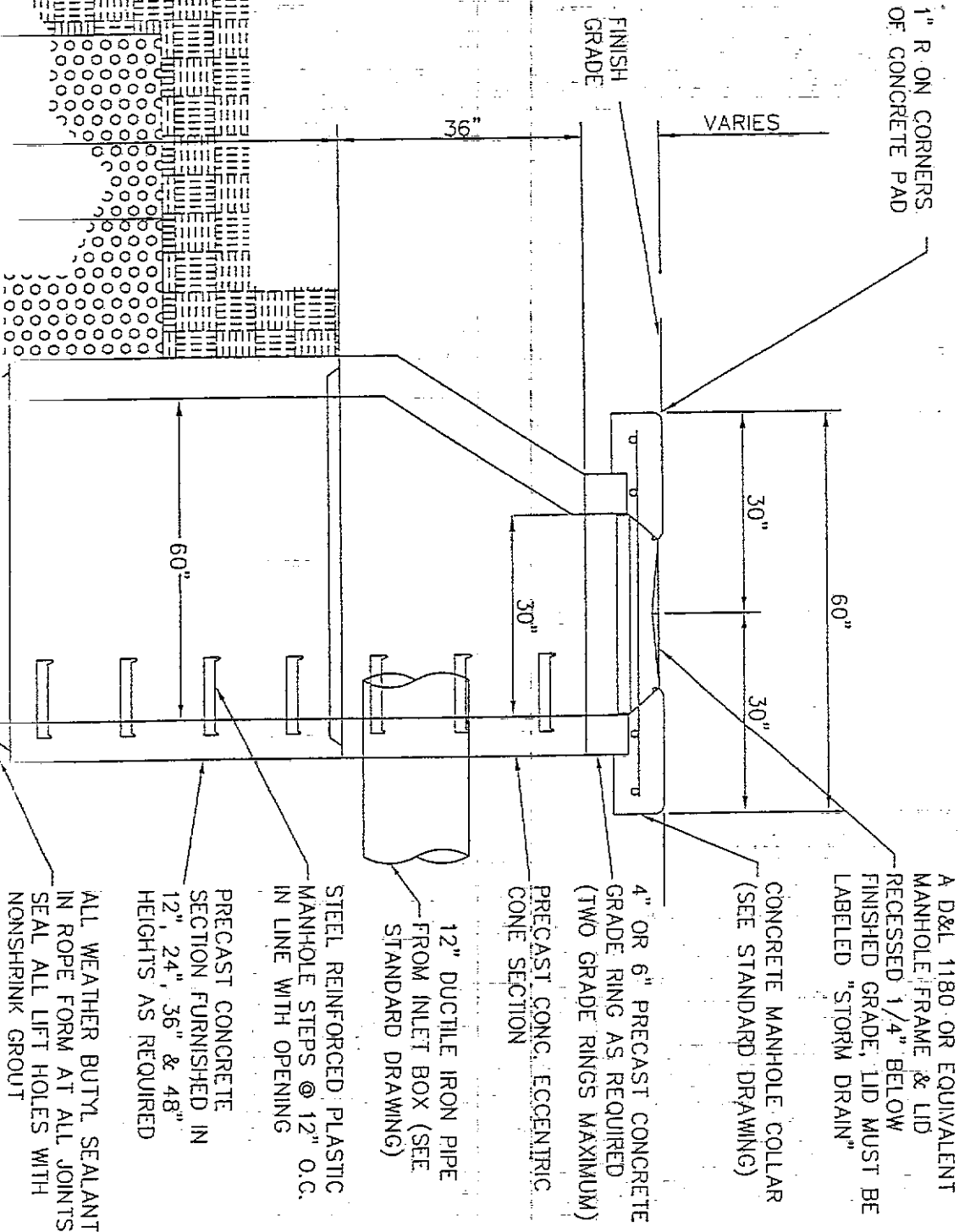


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1" R. ON CORNERS OF CONCRETE PAD

VARIES

FINISH GRADE

36"

30"

60"

30"

30"

60"

A D&L 1180 OR EQUIVALENT MANHOLE FRAME & LID RECESSED 1/4" BELOW FINISHED GRADE. LID MUST BE LABELED "STORM DRAIN"

CONCRETE MANHOLE COLLAR (SEE STANDARD DRAWING)

4" OR 6" PRECAST CONCRETE GRADE RING AS REQUIRED (TWO GRADE RINGS MAXIMUM)

PRECAST CONC. ECCENTRIC CONE SECTION

12" DUCTILE IRON PIPE FROM INLET BOX (SEE STANDARD DRAWING)

STEEL REINFORCED PLASTIC MANHOLE STEPS @ 12" O.C. IN LINE WITH OPENING

PRECAST CONCRETE SECTION FURNISHED IN 12", 24", 36" & 48" HEIGHTS AS REQUIRED

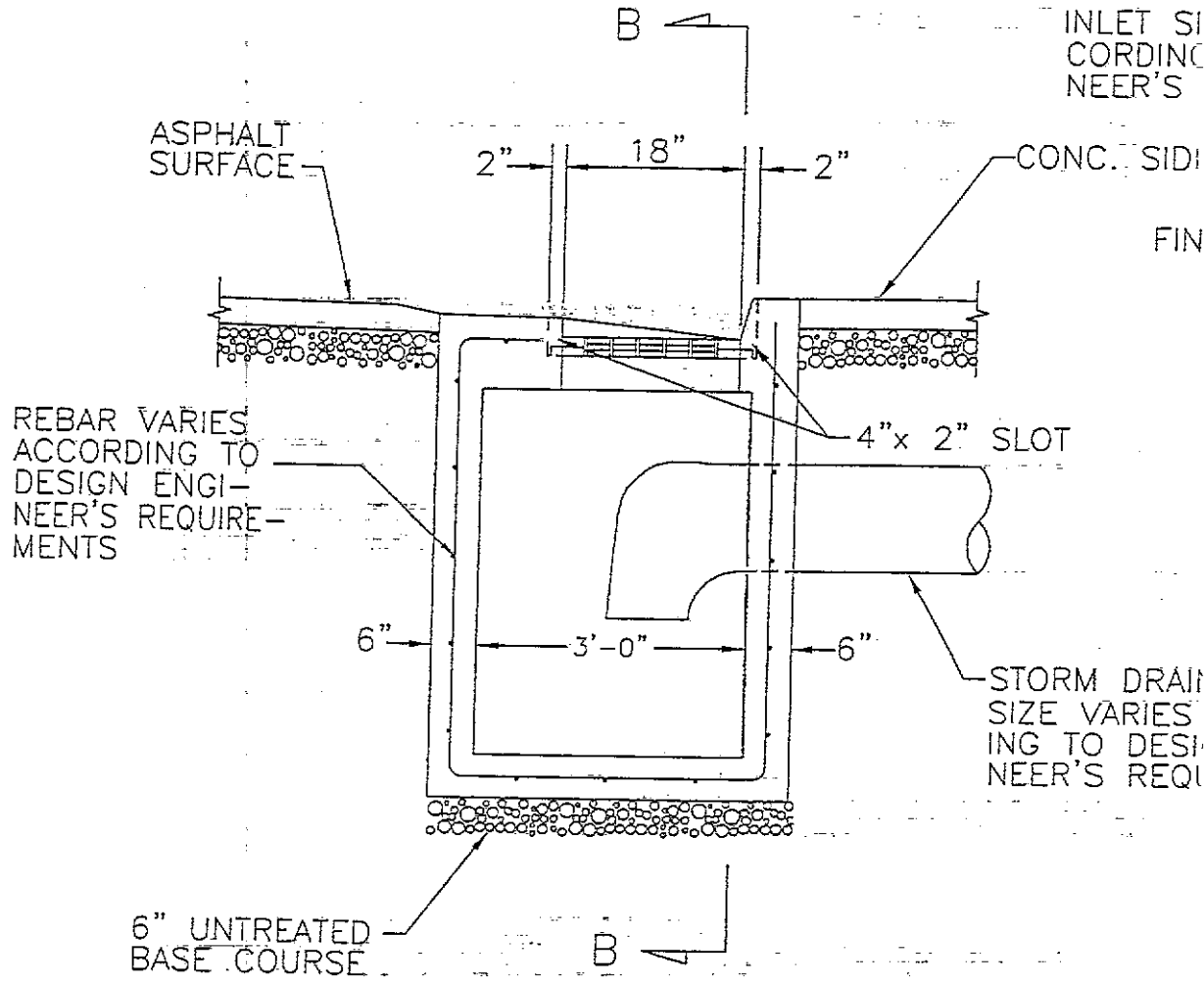
ALL WEATHER BUTYL SEALANT IN ROPE FORM AT ALL JOINTS SEAL ALL LIFT HOLES WITH NONSHRINK GROUT

SANTAQUIN CITY CONSTRUCTION STANDARDS

MANHOLE-SUMP

SD-2

DESIGN
DRAWN BY
DATE
SCALE
REVISION DATE & NUMBER



SECTION A-A

DETAIL - S
NO SCALE

FILE: SAHT MWSTAN STD003



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PREPARED BY SUNRISE ENGINEERING

MAY VARY AC-
CORD TO DESIGN ENGI-
NEER'S REQUIREMENTS

ALK

GRADE

STD. INLET GUTTER
TRANSITION GRATING

TYPE 'A' CURB
AND GUTTER

4" x 2" SLOT

PIPE
ACCORD-
ING TO ENGI-
NEER'S
REQUIREMENTS

6"

TYP.

3"

6'-5"

6"

VARIES

6"

6" UNTREATED
BASE COURSE

REBAR VARIES ACCORD-
ING TO DESIGN ENGI-
NEER'S REQUIREMENTS

SECTION B-B

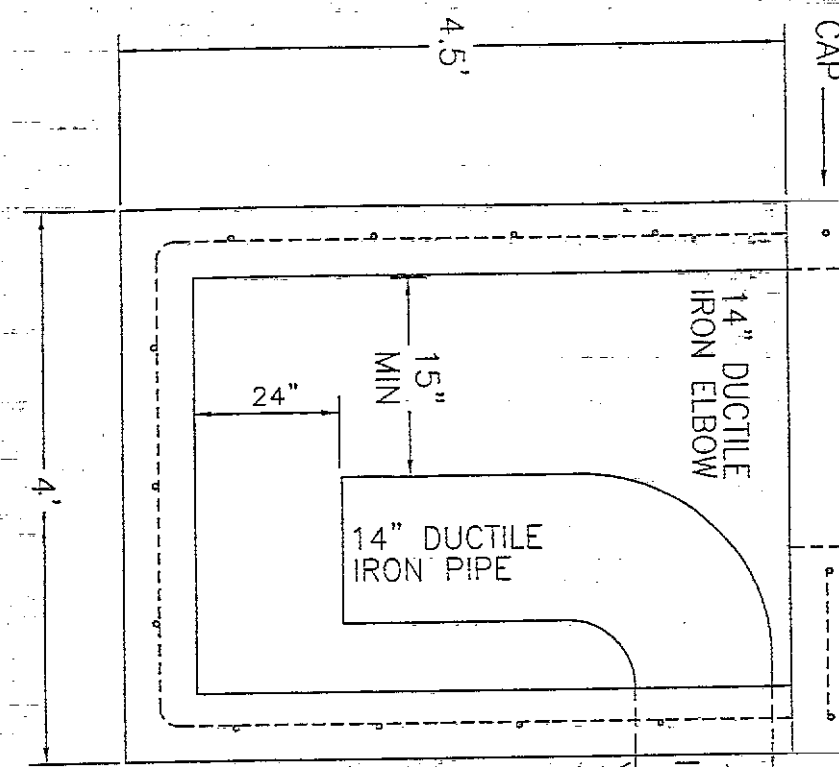
FORM DRAIN BOX

SANTAQUIN CITY
CONSTRUCTION STANDARDS

SD-3

STORM DRAIN BOX

DATE
DRAWN BY
CHECKED BY
SCALE
APPROVED BY



- NOTE:
- 1: ALL STORM TRANSMISSION LINES SHALL RUN THROUGH STORM MANHOLES
 - 2: #4 REBAR WILL BE SPACED AT A MINIMUM OF 12" O.C. IN ALL DIRECTIONS IN CONCRETE
 - 3: REBAR SHALL OVERLAP A MINIMUM OF 14"
 - 4: ALL BOLTS SHALL BE STAINLESS STEEL
 - 5: ALL DUCTILE IRON PIPE AND FITTINGS SHALL BE EPOXY COATED

MIN SLOPE 1%
DOWN TO MANHOLE
OR SUMP

GROUT ALL
AROUND PIPE

MAY USE A 3 X 3 X 4 PRECAST
BOX WHICH MEETS H-20 LOADING
AND ASTM SPECIFICATION C-858
FOR UNDERGROUND UTILITY
STRUCTURES

DETAIL - DROP INLET BOX
NO SCALE

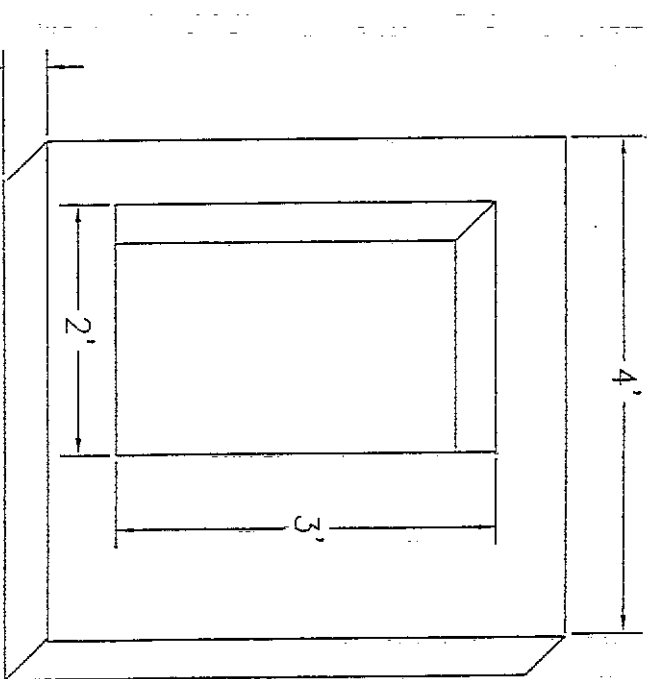
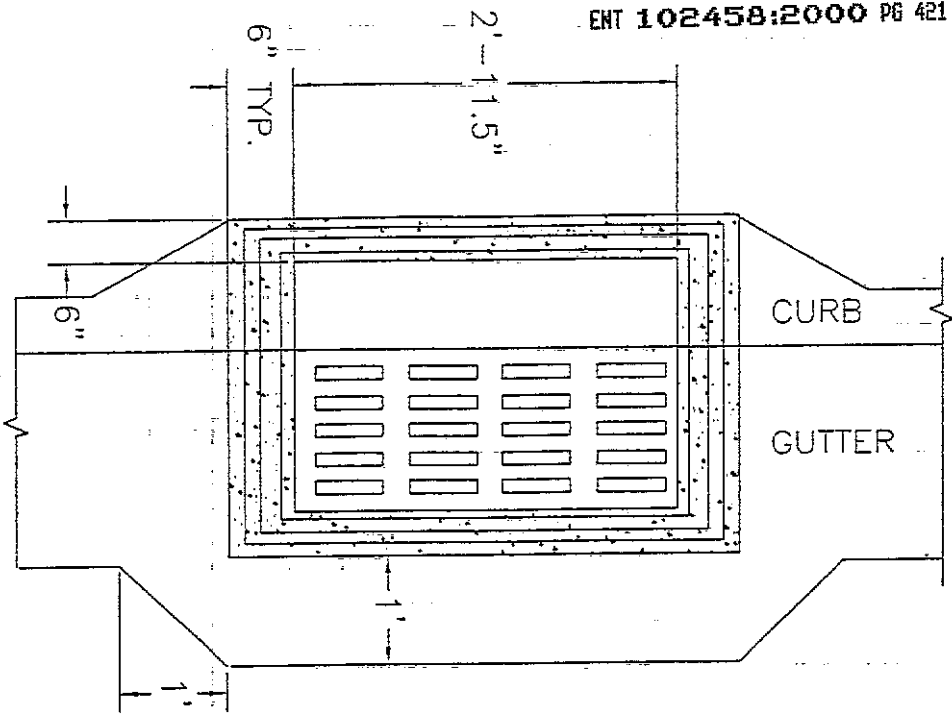
FILE: SANI NINSTAN SIDRO3B



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PREPARED BY SUNRISE ENGINEERING



D&L 1-3516 OR APPROVED EQUAL
SHALL BE USED WITH ADJUSTIBLE
CURB BOX

CAP DIMENSIONS

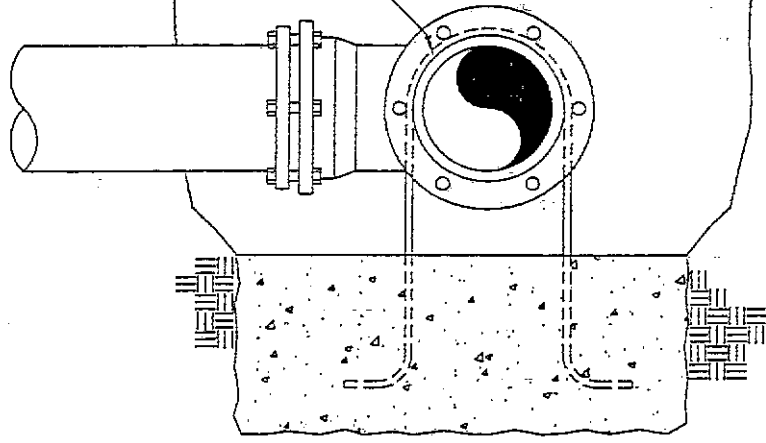
SANTAQUIN CITY CONSTRUCTION STANDARDS

STORM DRAIN BOX

SD-4

DESIGN
DRAWN BY
CHECK
SCALE
REVISION DATE & NUMBER

TEE CONNECTED TO WATER MAIN (NEW OR EXIST.)



DETAIL
NO SCALE

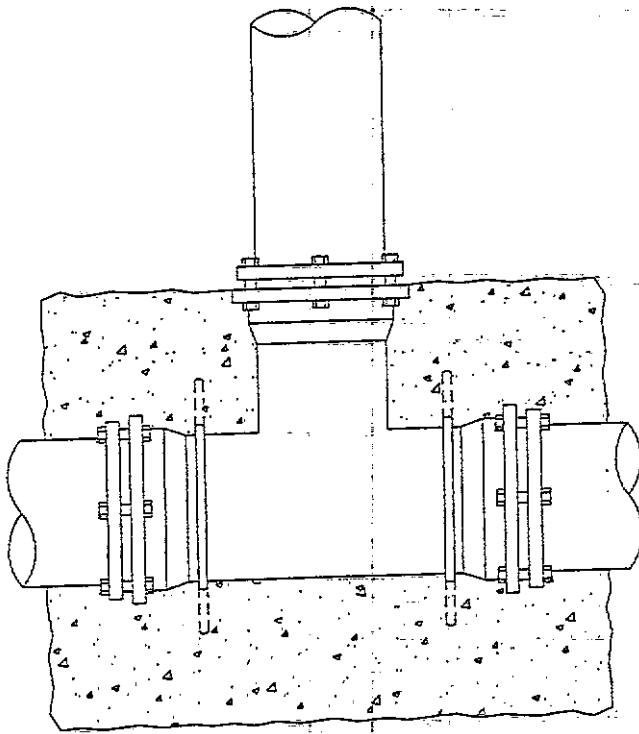
FILE: SANT NWSTAN WTR02b



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WATER MAIN TEE

SANTAQUIN CITY CONSTRUCTION STANDARDS

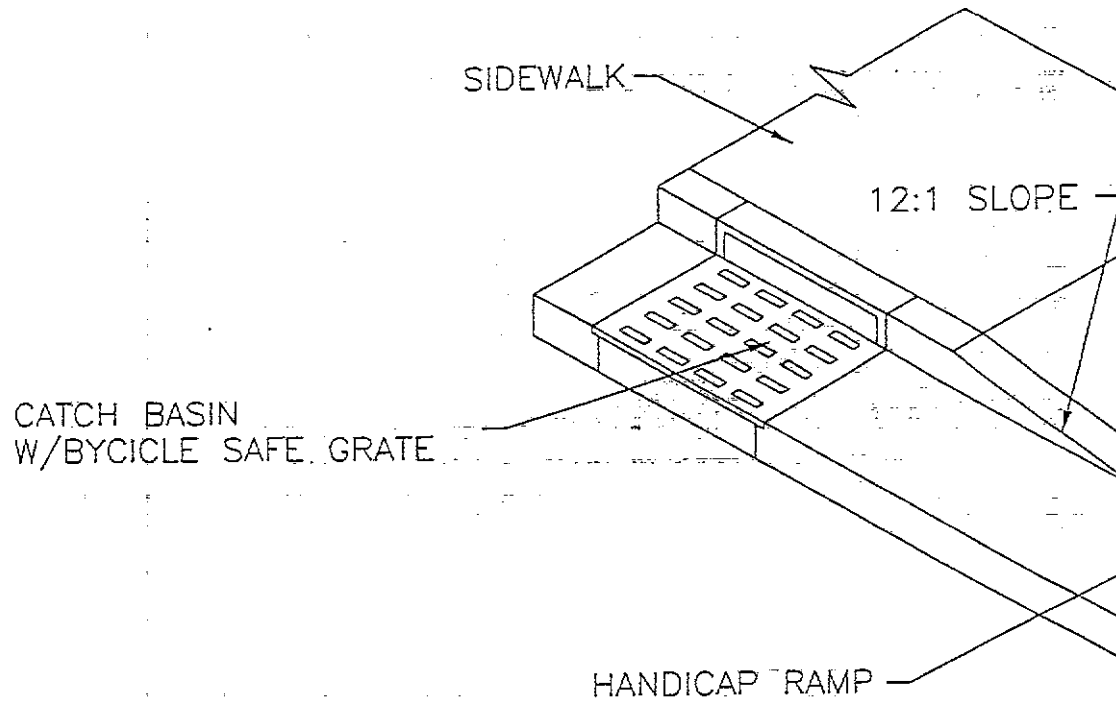
SD-5

FIRE HYDRANT

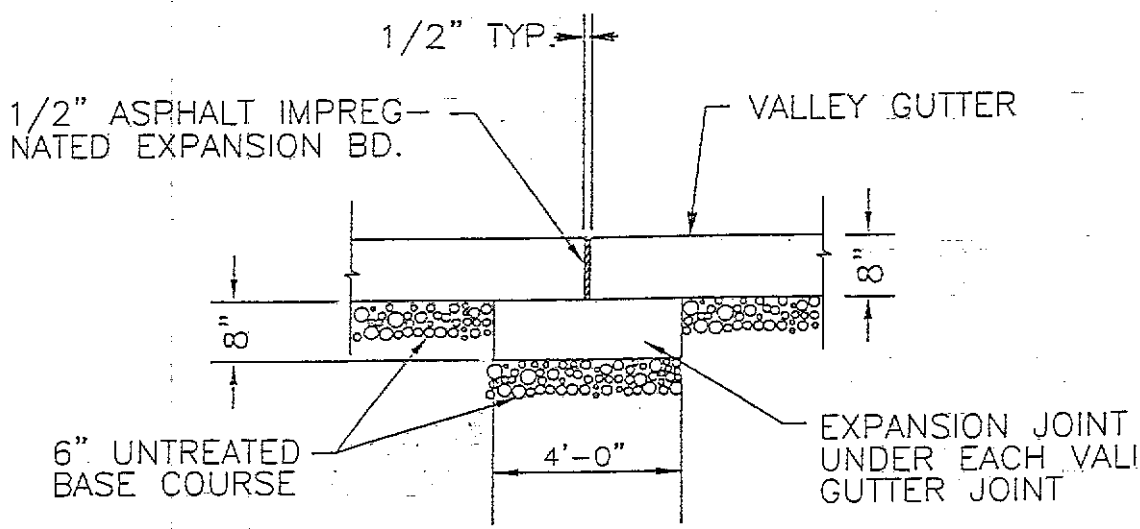
DESIGN
DRAWN BY
DATE
SCALE
BY/ISSUED DATE & NUMBER

Sidev Curb & Gu

Walk ter Details



FLOW LINE OF VALLEY GUTTER TROWLED
FLOW AS REQ'D



SECTION A-A

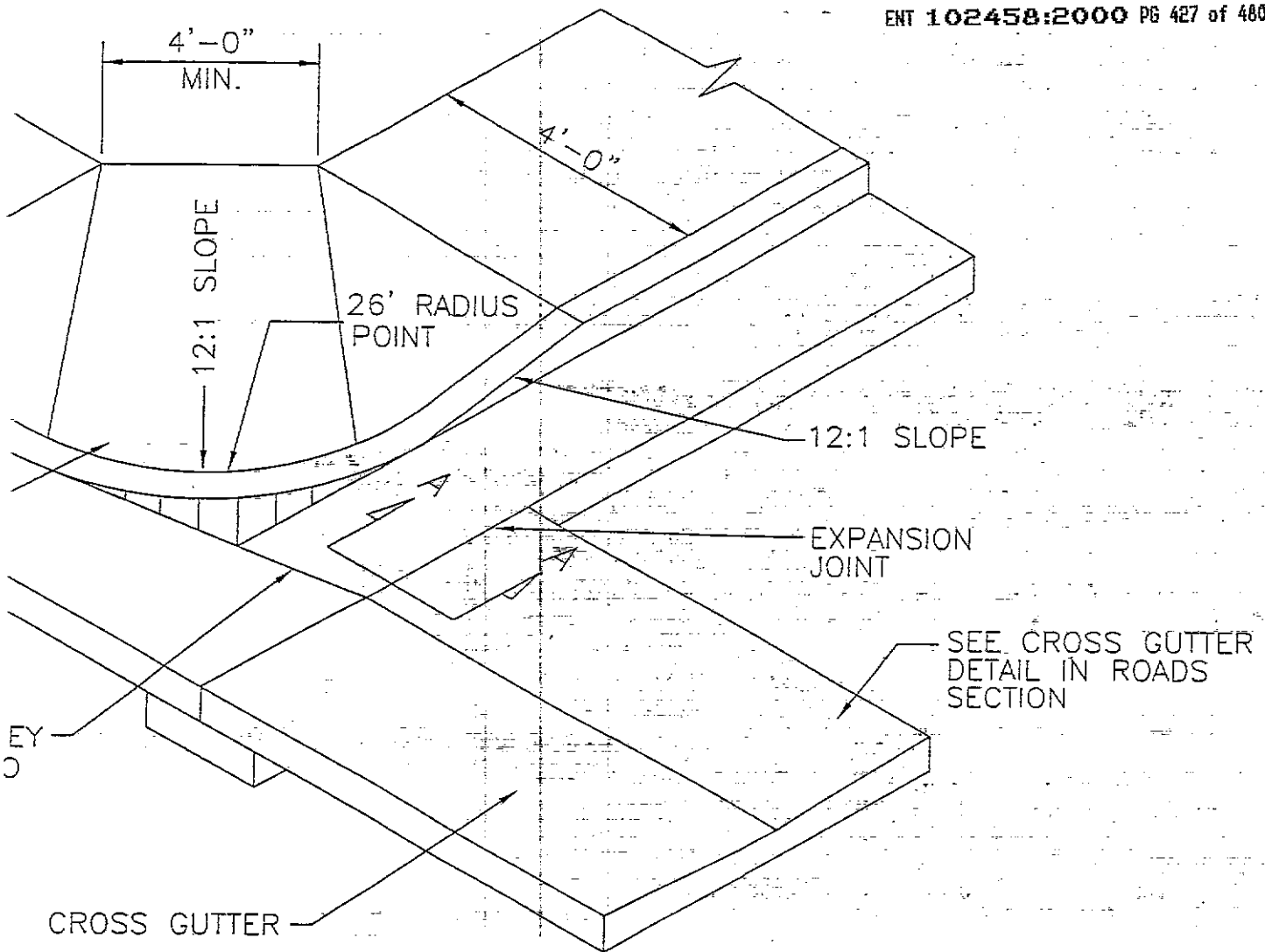
FILE: ... MISSION W/NOI



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DETAIL - A.D.A. RAMP

W/ VALLEY GUTTER

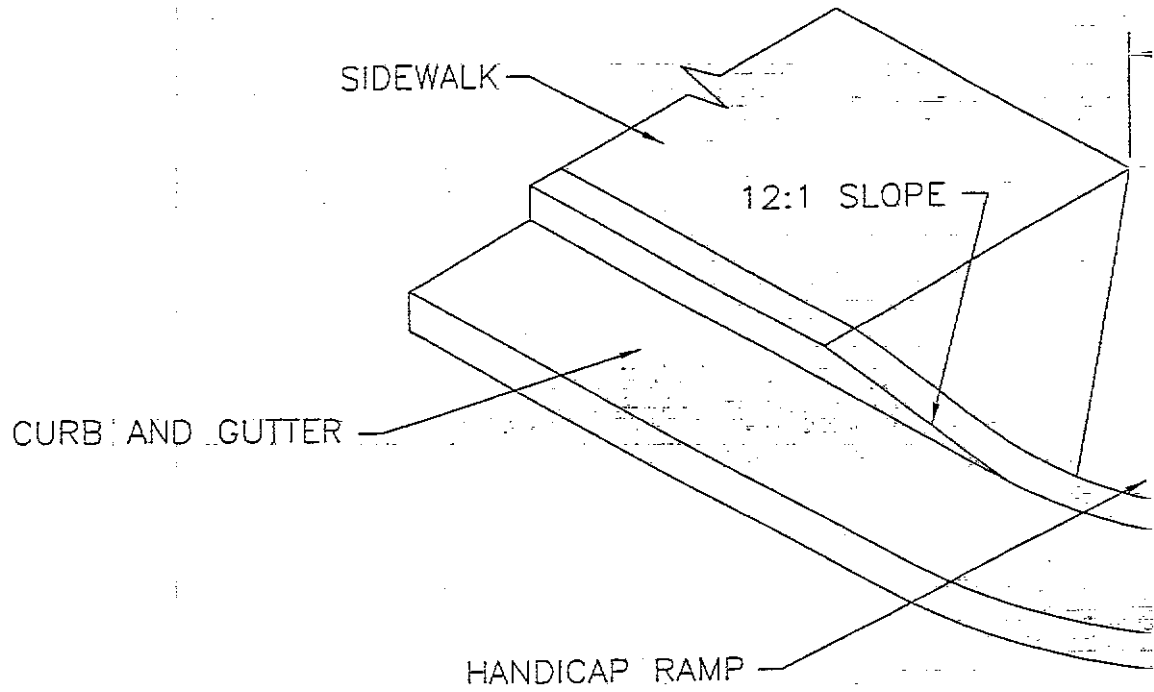
NO SCALE

SANTAQUIN CITY
CONSTRUCTION STANDARDS

SIDEWALK/HANDICAP RAMP

SCG-1

DESIGN
DRAWN BY
DATE
SCALE
REVISION DATE & NUMBER



DETAIL —
NO SCALE

FILE: SANT NWSTAN WLK02

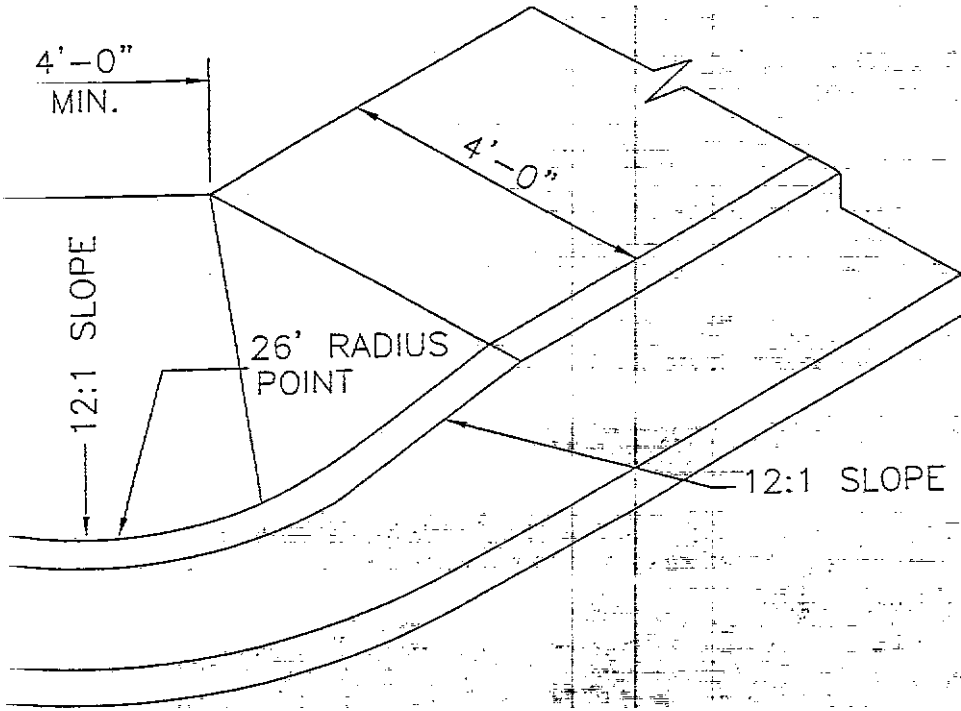


Santaquin City

45 west 100 south

Santaquin Utah , 84655

PREPARED BY SUNRISE ENGINEERING



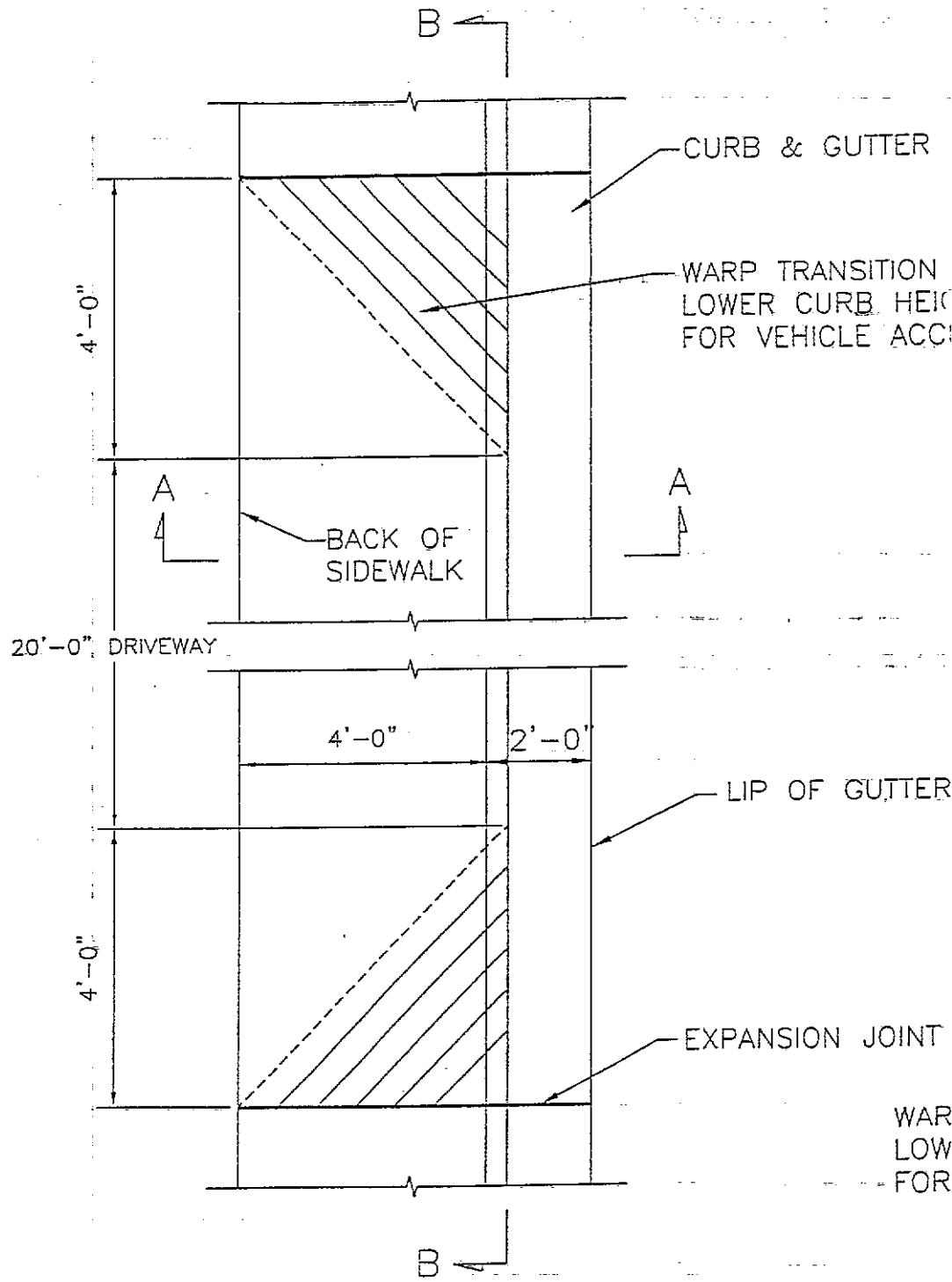
A.D.A. RAMP

SANTAQUIN CITY CONSTRUCTION STANDARDS

SIDEWALK/HANDICAP RAMP

SCS-2

DESIGN
DRAWN BY
DATE
SCALE
REVISION DATE & NUMBER



PLAN

FILE: SAINT NWSTAN WIKO3

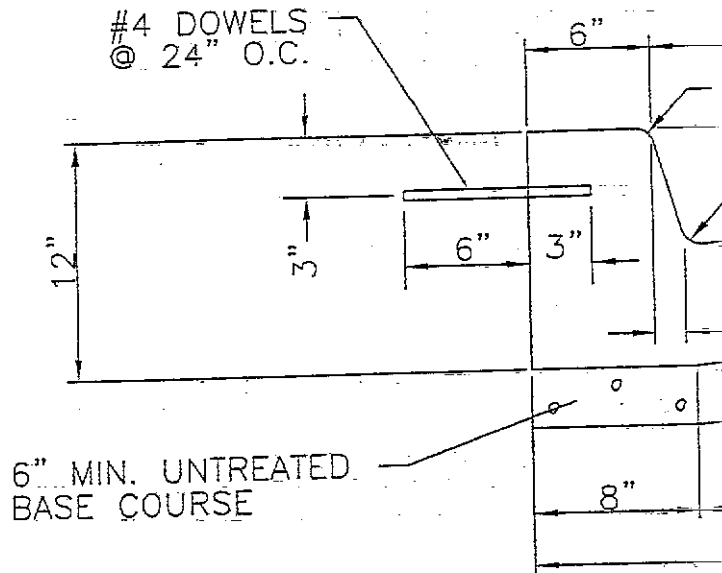


Santaquin City

45 west 100 south

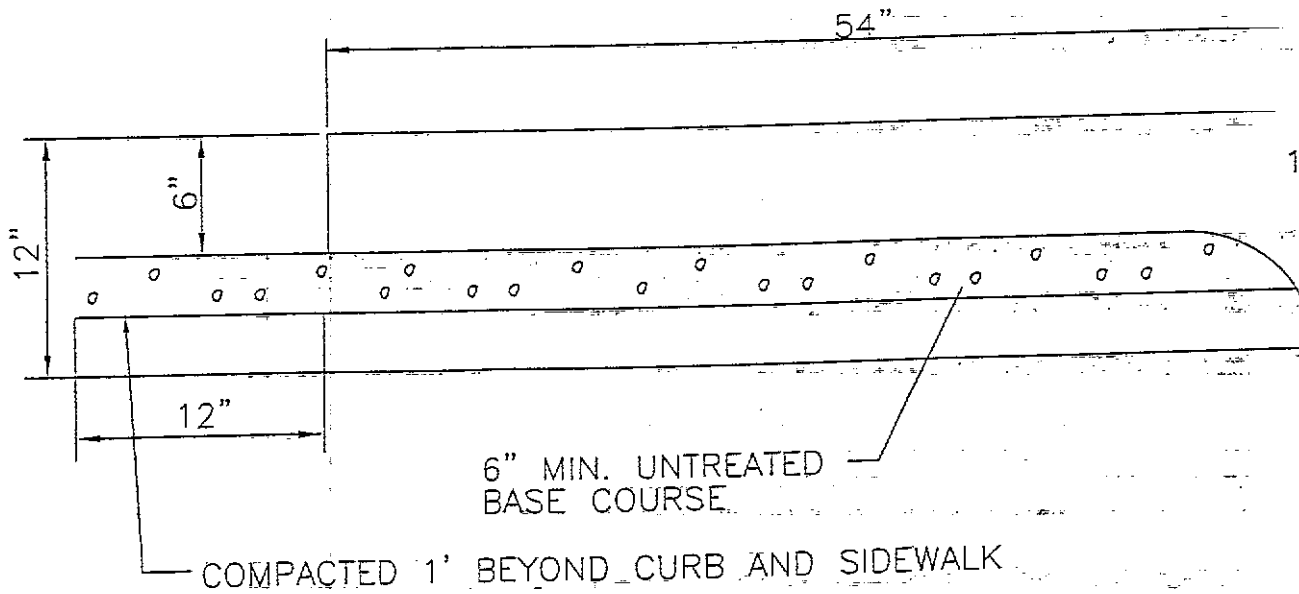
Santaquin Utah , 84655

PREPARED BY SUNRISE ENGINEERING



DETAIL — CURB AND
NO SCALE

ENT 102458:2000 PG 432 of 480



DETAIL — CURB, GUTTER AND
NO SCALE

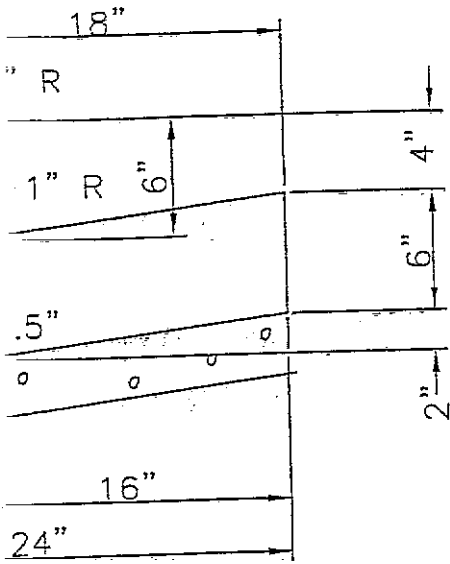
FILE: SAINT INSTANT MK04



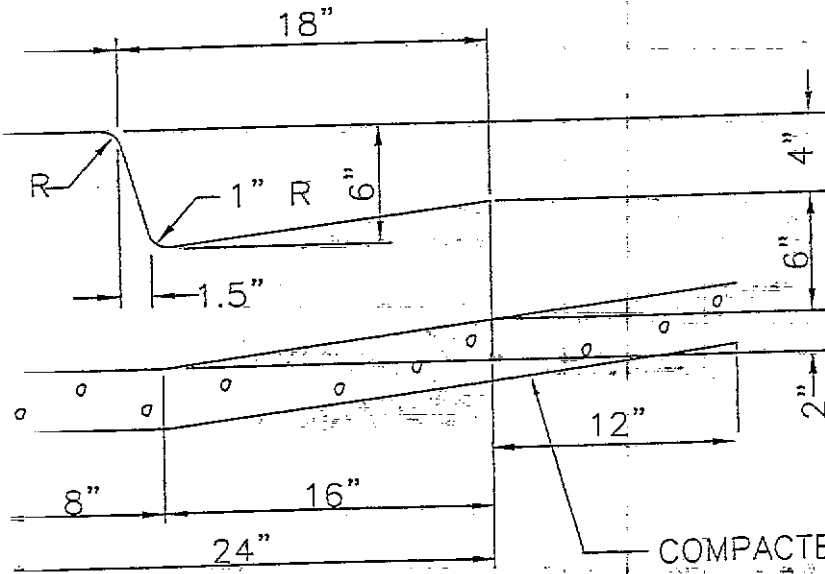
Santaquin City

45 west 100 south
Santaquin Utah, 84655

PREPARED BY SUNRISE ENGINEERING



GUTTER



COMPACTED 1' BEYOND CURB AND SIDEWALK

NOTE:
ALL COMMERCIAL SIDEWALKS TO BE 5' WIDE.

SIDEWALK

SANTAQUIN CITY
CONSTRUCTION STANDARDS

SIDEWALK/CURB & GUTTER

SCG-4

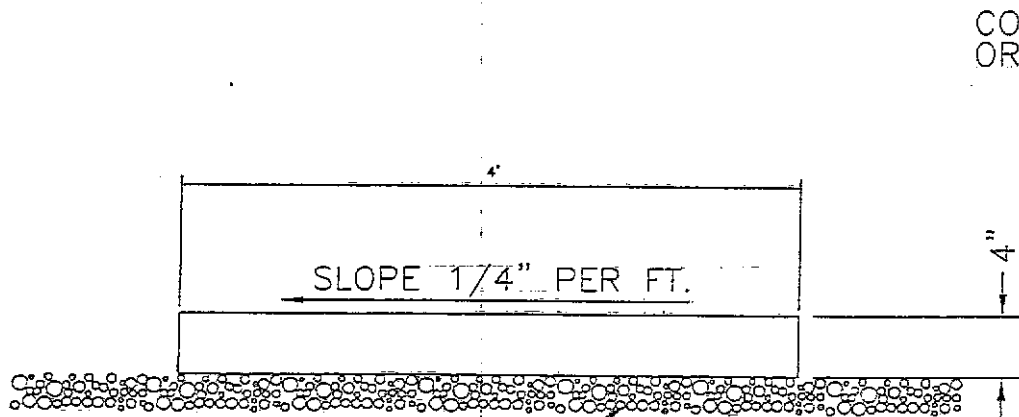
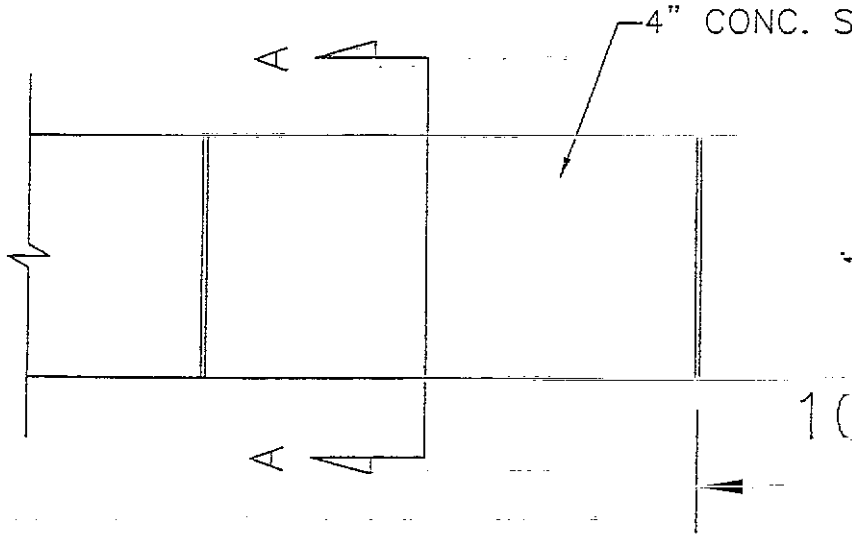
DESIGN

DRAWN BY

DATE

SCALE

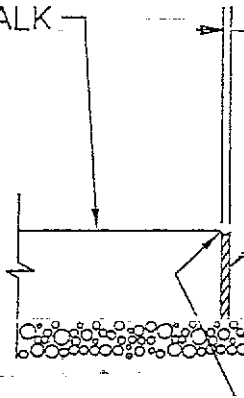
REVISION DATE & NUMBER



6" UNTREATED
BASE COURSE
1' BEYOND CURB
AND SIDEWALK

SECTION A-A

CONC. SIDEWALK
OR DRIVEWAY



NOTE: EXPANSION JOINT
FOR CURB, CONC.
AND BLOCKOUT

SECTION

DETAIL
NO SCALE

FILE: 2001.01.05.05



Santaquin City

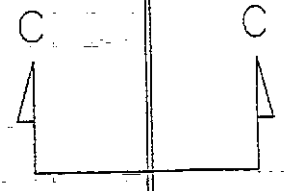
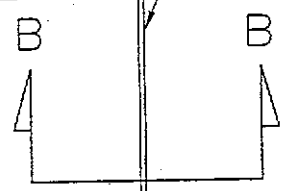
45 west 100 south
Santaquin Utah, 84655

PREPARED BY SUNRISE ENGINEERING

WALK

EXPANSION JOINT EVERY 80' MINIMUM

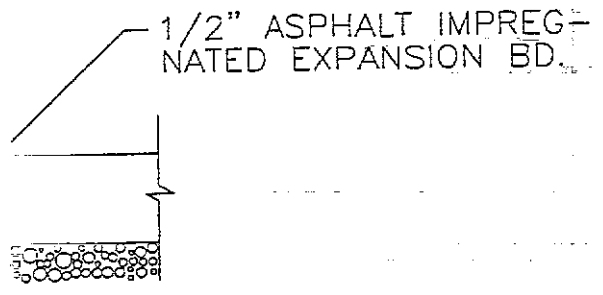
ENT 102458:2000 PG 435 of 480



MAX.

PLAN

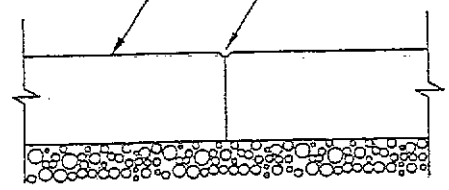
1/2" TYP.



1/4" R TYP.

CONC. SIDEWALK OR DRIVEWAY

1/2" TOOLED JOINT



NOTE: TOOLED JOINT IS TYPICAL FOR CURB, GUTTER, SIDEWALK, AND BLOCKOUTS

B-B

SECTION C-C

SIDEWALK

SANTAQUIN CITY CONSTRUCTION STANDARDS

SCG-5

SIDEWALK

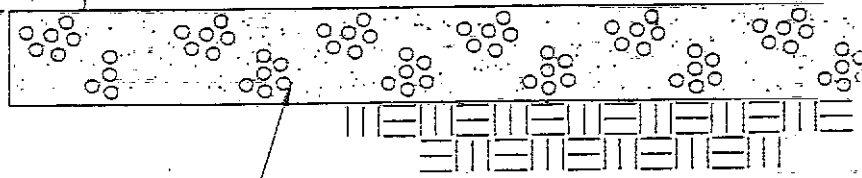
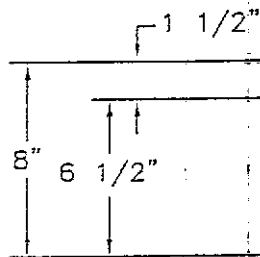
DATE
DRAWN BY
DATE
SCALE
REVISION DATE & NUMBER

Road Right-of-Way

s and Way Details

2'-0"

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8" MIN. UNIFORM
BASE COURSE

SECTION
NO SCALE

FILE: SANT ANISHAH RD001



Santiquin City

45 west 100 south
Santiquin Utah , 84655

PREPARED BY SUNRISE ENGINEERING

4'-0"

2'-0"

ENT 102458:2000 PG 439 of 400

3" TYP.

3" TYP.

#5 @ 12" O.C. B.W.

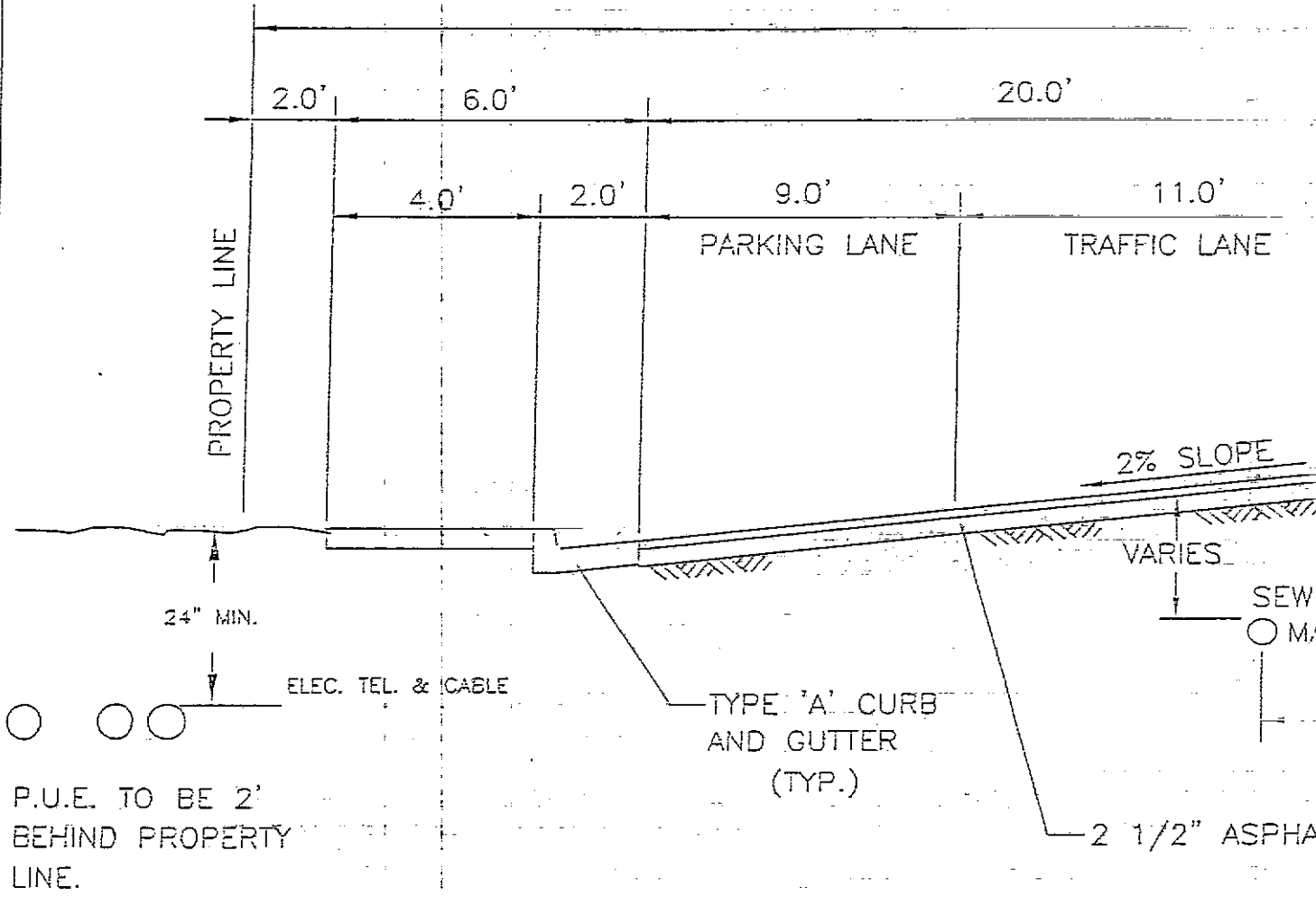
CROSS GUTTER

SANTAQUIN CITY CONSTRUCTION STANDARDS

ROADS

R-1
1 of 3

DESIGN
DRAWN BY
DATE
SCALE
REVISION DATE & NUMBER



SECTION - 56'

WITH

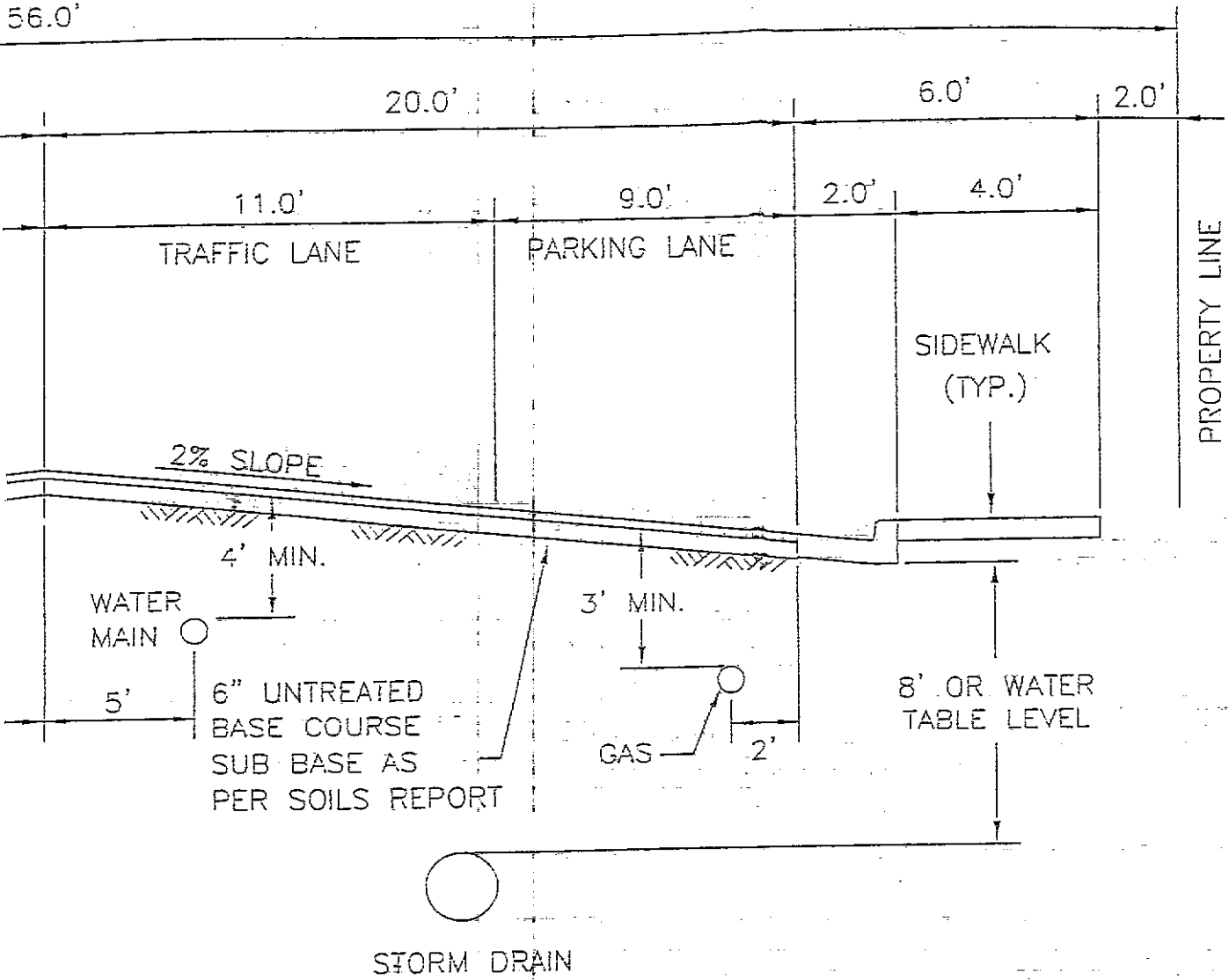
ANTI INVERSION ROAD



Santaquin City

45 west 100 south
Santaquin Utah, 84655

PREPARED BY SUNRISE ENGINEERING



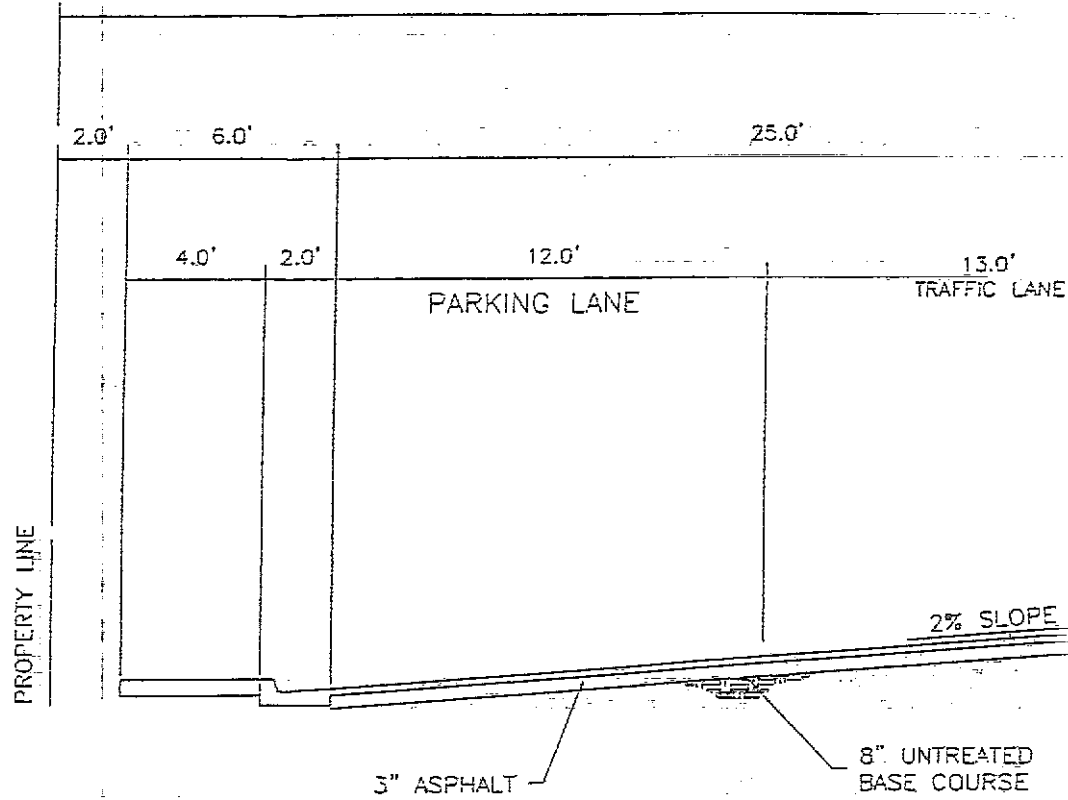
ROAD RIGHT-OF-WAY

UTILITIES

SANTAQUIN CITY CONSTRUCTION STANDARDS

R-2

LOGO
DRAWN BY
DATE
SCALE
PROJECT FILE # NUMBER



SECTION —

FILE: STAN HWSTAHJ RD000

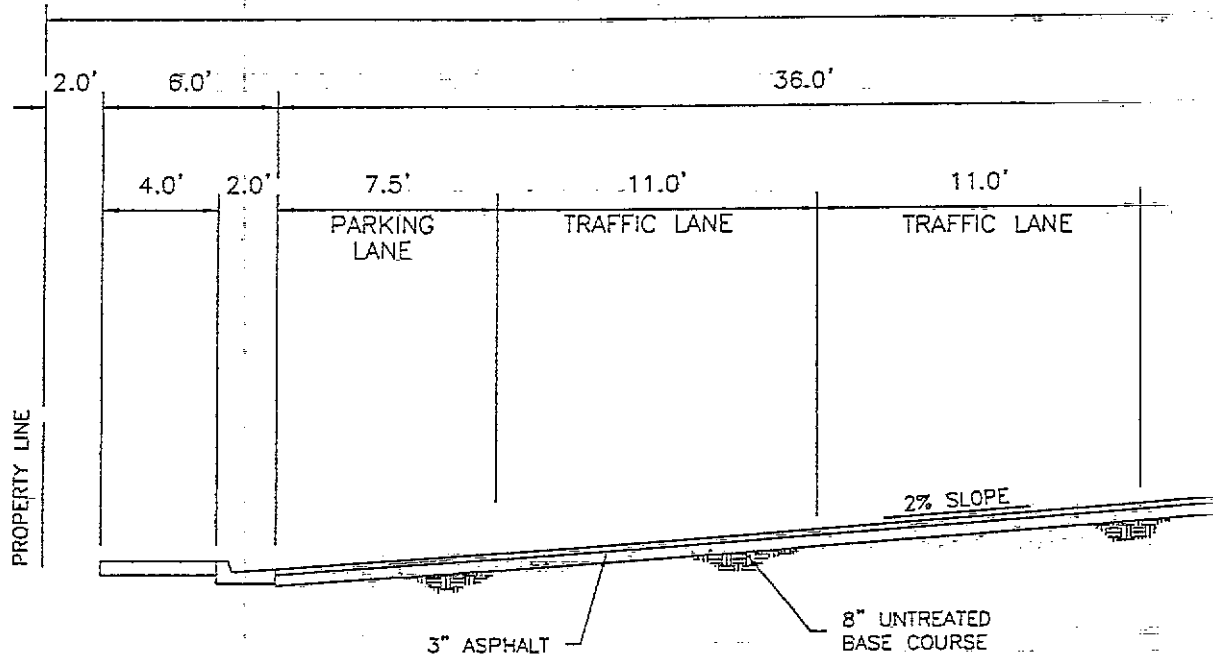


Santaquin City

45 west 100 south

Santaquin Utah, 84655

PREPARED BY SUNRISE ENGINEERING



SECTION - 8

FILE: SALT HWY 8900

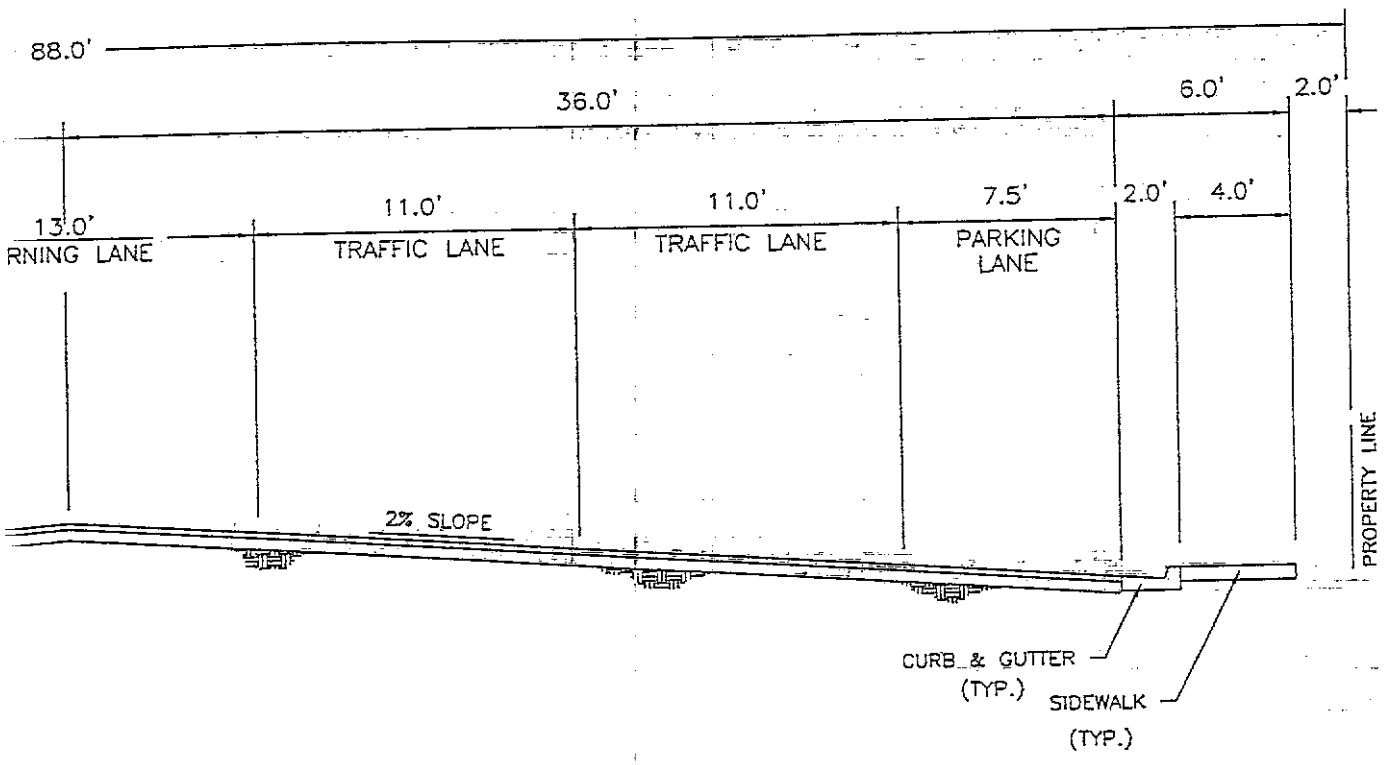


Santaquin City

45 west 100 south

Santaquin Utah, 84655

PREPARED BY SUNRISE ENGINEERING

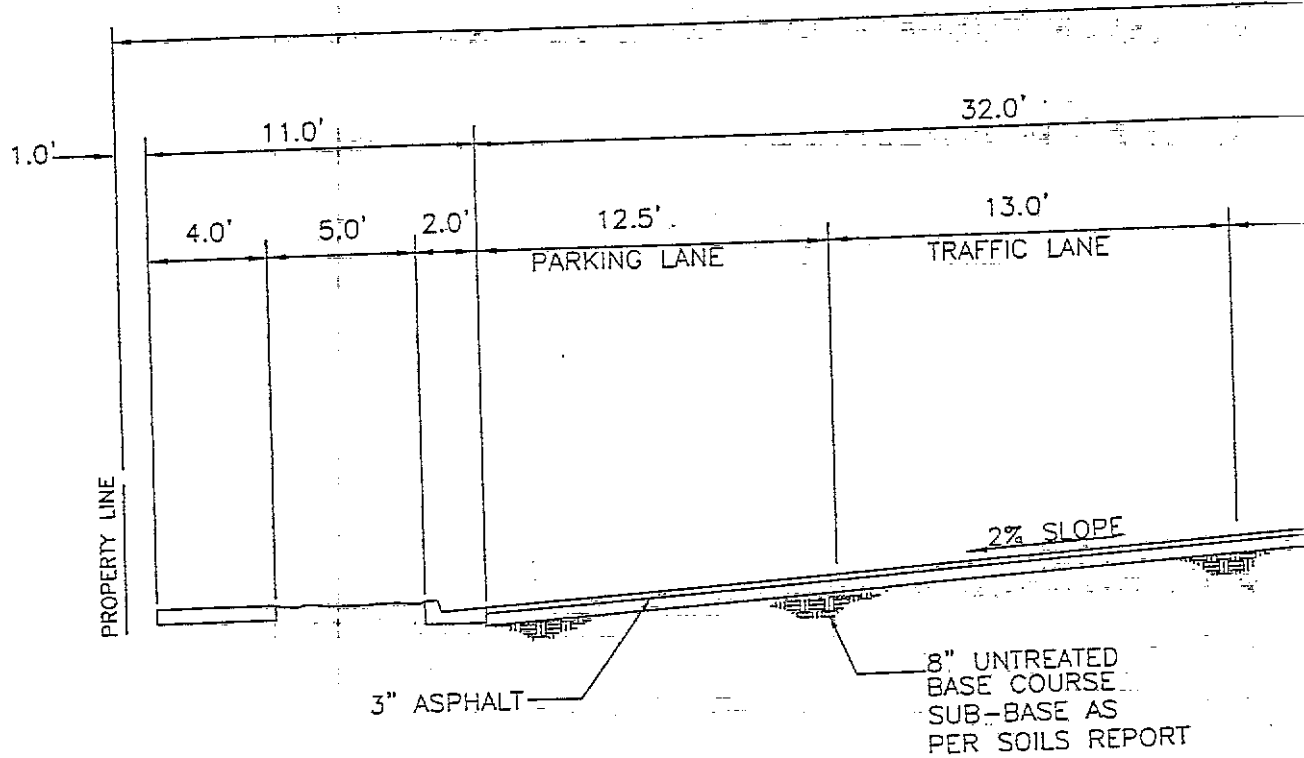


ROAD RIGHT-OF-WAY

SANTAQUIN CITY CONSTRUCTION STANDARDS

R-4

DESIGN
DRAWN BY
CHECK
SCALE
REVISION DATE & NUMBER



SECTION -
WIT

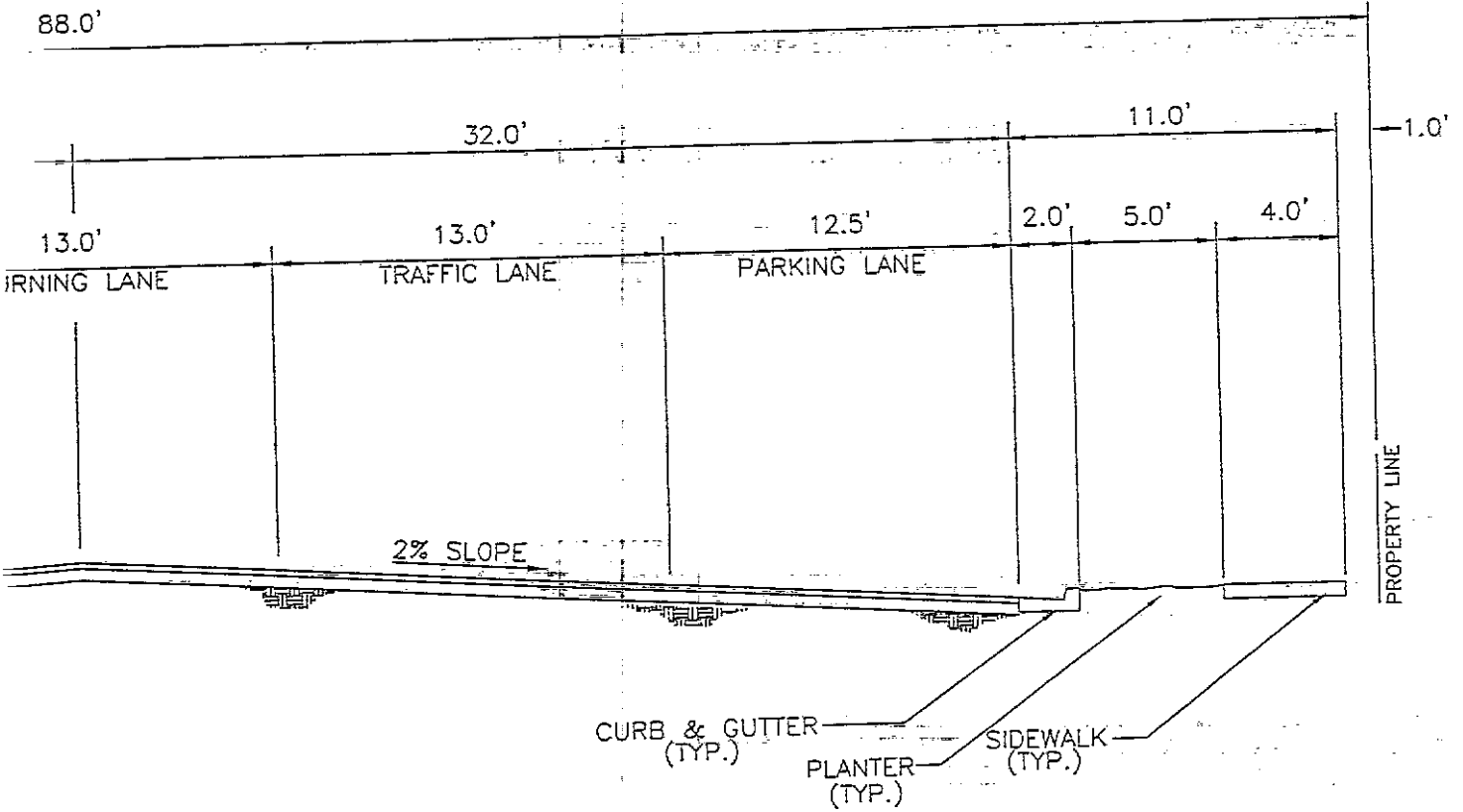
FILE: SAINT ANSTAN RD05



Santaquin City

45 west 100 south
Santaquin Utah, 84655

PREPARED BY SUNRISE ENGINEERING



3' ROAD RIGHT-OF-WAY
5' PLANTER

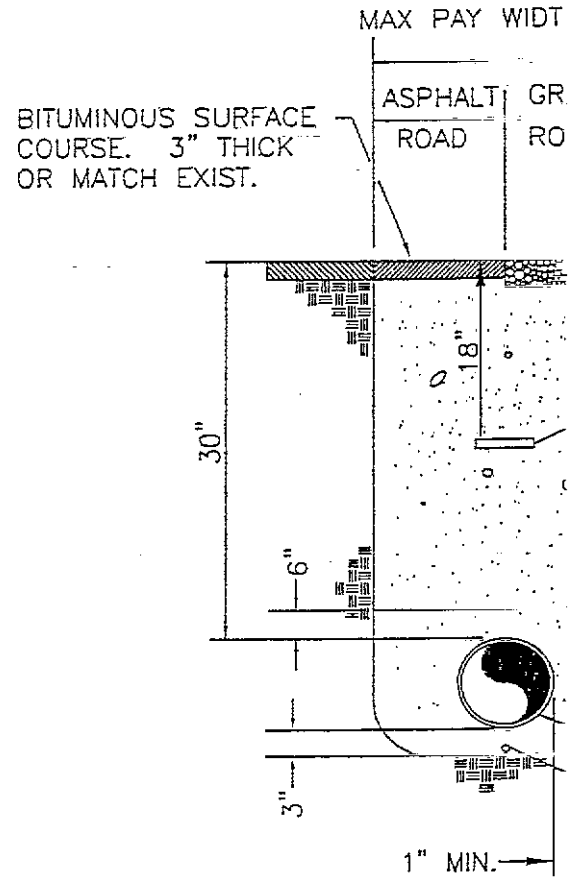
SANTAQUIN CITY CONSTRUCTION STANDARDS

R-5

EDOR
DRAWN BY
CHK
SCALE
REVISED DATE & NUMBER

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Gas Pipe Details



B DETAIL - TYPICAL TRENCH
TYP NO SCALE

NOTE:

- 1- TRENCH DETAIL APPLIES TO ROAD SURFACES, DRIVEWAYS WHERE SURFACE IMPROVEMENT IS REQUIRED
- 2- EXISTING ASPHALT SHALL BE REPAIRED TO MATCH EXISTING

FILE: SANT NWSTAN CPO1

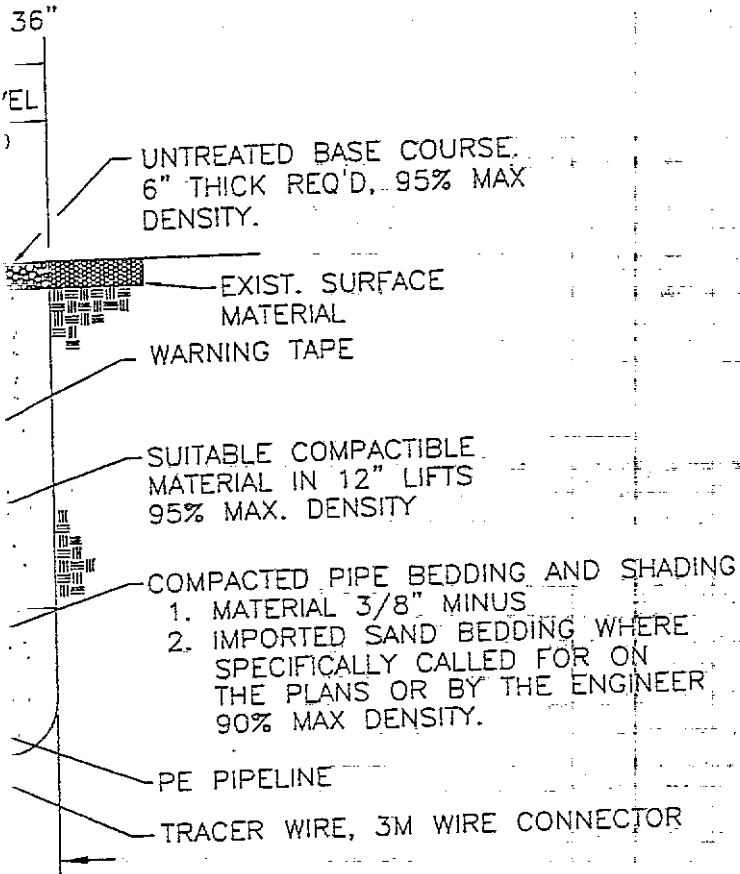


Santaquin City

45 west 100 south

Santaquin Utah, 84655

PREPARED BY SUNRISE ENGINEERING



CH UNDER ROAD SURFACE

NO AREAS WITHIN INSIDE ASPHALT / GRAVEL
WAYS, IRRIGATION DITCHES, AND ALL AREAS
MENTS MAY BE CONSTRUCTED.
BE SAW CUT.

SANTAQUIN CITY CONSTRUCTION STANDARDS

GAS PE PIPELINE

G-1

DESIGN
DRAWN BY
DATE
SCALE
REVISION DATE & NUMBER

WHEN RECORDED RETURN TO:

Diane H. Banks, Esq.
Fabian & Clendenin
215 S. State St., #1200
Salt Lake City, UT 84111

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**MEMORANDUM OF ANNEXATION AND DEVELOPMENT
AGREEMENT
FOR SUMMIT RIDGE**

THIS MEMORANDUM OF ANNEXATION AND DEVELOPMENT AGREEMENT for Summit Ridge (the "Memorandum") is entered into as of the 7 day of ~~August~~^{December}, 2000 by and between Summit Ridge Development, LLC, a Utah limited liability company, Santaquin City, a third class city of the State of Utah ("City") South County Development, L.C., a Utah limited liability company, Shirl L. Ekins as Trustee of the Shirl L. Ekins Family Trust, Lori Ann Ekins Dunn as Trustee of the Shirl L. Ekins Family Irrevocable Trust, UTAH S.H.O.P., LLC, a Utah limited liability Company, Darlene and Daryl Kay, Trustees of the Daryl J. Kay Family Trust, Willis H. and Coy Morgan and the State of Utah acting through the School and Institutional Trust Lands Administration (collectively, the "Parties").

WHEREAS, the Parties have entered into that certain Annexation and Development Agreement for Summit Ridge dated ~~August~~^{December} 7, 2000 (the "Agreement"), a copy of which is available from the City Recorder at no charge upon request; and

WHEREAS, the Agreement affects certain real property more specifically described on the attached Exhibit A (the "Property"); and

WHEREAS, the Parties desire to have the existence of the Agreement recorded so that it becomes a matter of public record and gives constructive notice of all terms, conditions and obligations set forth therein.

NOW, THEREFORE, in consideration of the premises and other good and valuable consideration set forth in the Agreement,

A. The Parties have entered into the Agreement with an intent to be bound by all its terms and conditions and to subject the Property to those terms and conditions; and

B. The Agreement has a term of twenty (20) years unless extended or terminated pursuant to the terms of the Agreement; and

C. The Agreement and all of the obligations of the respective Parties thereunder runs with the Property.

D. This Memorandum is being executed solely to give notice of the Agreement and is not intended to amend the Agreement in any respect. The Agreement imposes certain burdens on the Property and certain obligations on the parties thereto and the subsequent owners of the subject properties. By recording this Memorandum, all subsequent owners and interested parties have notice of those burdens and obligations.

IN WITNESS WHEREOF, this Agreement has been executed by those duly authorized to execute the same and by the City of Santaquin, acting by and through its City Council as of the 7 day of August, 2000.

Dee C. Miller

SANTAQUIN CITY

By: *LaDuc Scovill*
LaDuc Scovill, Mayor

ATTEST: City Recorder

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By: *Susan Earnsworth*
Susan Earnsworth, City Recorder

APPROVED AS TO FORM:

Mitchell D. Magellan
Mitchell D. Magellan, City Attorney
Scott B. Rich

SUMMIT RIDGE DEVELOPMENT, LLC
a Utah limited liability company

By: *R. Kent Kunz*
R. Kent Kunz, Managing Member

SOUTH COUNTY DEVELOPMENT, L.C.,
a Utah limited liability company

By: [Signature]
Its: Managing Member

SHIRL L. EKINS FAMILY TRUST

By: Shirl L. Ekins, Trustee
Shirl L. Ekins, Trustee

SHIRL L. EKINS FAMILY IRREVOCABLE TRUST

By: Lori Ann Ekins Dunn, Trustee
Lori Ann Ekins Dunn, Trustee

UTAH S.H.O.P., LLC, a Utah limited liability company

By: Don Larsen
Its: Managing Member

DARYL J. KAY FAMILY TRUST

By: Daryl J. Kay
Daryl J. Kay, Trustee

By: Darlene Kay
Darlene Kay, Trustee

[Signature]
COY MORGAN, an individual

Willis H. Morgan
WILLIS H. MORGAN, an individual

STATE OF UTAH, ACTING THROUGH
THE SCHOOL AND INSTITUTIONAL
TRUST LAND ADMINISTRATION

APPROVED AS TO FORM:
JAN GRAHAM
ATTORNEY GENERAL

[Signature]

By: *D. P. T. [Signature]*
Its: DIRECTOR

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STATE OF UTAH)
) : ss.
COUNTY OF UTAH)

On this 7 day of August, 2000, before me, December, the undersigned Notary Public, personally appeared LADUE SCOVILL, personally known to me, and acknowledged he is the Mayor of Santaquin City, and further acknowledged to me that this document was executed on behalf of the City for the purposes set forth herein.

Witness my hand and official seal.

Sherron Davis
Notary Public
Residing in Santaquin, Utah



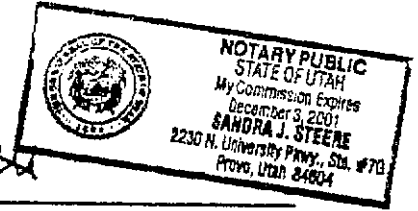
STATE OF UTAH)

COUNTY OF Utah)
:SS

On this 31st day of August, 2000, before me, Sandra J. Steere, the undersigned Notary Public, personally appeared R. KENT KUNZ, personally known to me, and acknowledged that he is the Managing Member of SUMMIT RIDGE DEVELOPMENT, LLC, and further acknowledged that this document was executed on behalf of the limited liability company named herein for the purposes set forth herein.

Witness my hand and official seal.

Sandra J. Steere



Notary Public, State of Utah
Residing in Orrem Utah

STATE OF UTAH)

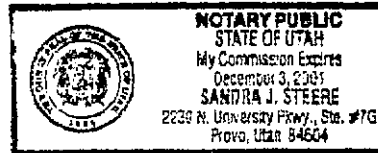
COUNTY OF Utah)
:SS

On this 30th day of August, 2000, before me, Sandra J. Steere, the undersigned Notary Public, personally appeared Hal M. Maglibay, personally known to me, and acknowledged that he is the member/manager of SOUTH COUNTY DEVELOPMENT, L.C., and further acknowledged that this document was executed on behalf of the limited liability company named herein for the purposes set forth herein.

Witness my hand and official seal.

Sandra J. Steere

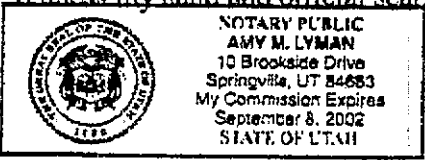
Notary Public, State of Utah
Residing in Orrem Utah



STATE OF UTAH)
)
) : ss.
)
COUNTY OF Utah)

On this 30th day of August, 2000, before me Amy M. Lyman the undersigned Notary Public, personally appeared SHIRL L. EKINS, personally known to me, who acknowledged to me that he executed this document as a Trustee of the SHIRL L. EKINS FAMILY TRUST, on behalf of the trust, and acknowledged to me that the trust executed this document for the purposes set forth herein.

Witness my hand and official seal



Amy M. Lyman
Notary Public
Residing in Santaquin, Utah

STATE OF UTAH)
)
) : ss.
)
COUNTY OF Salt Lake)

On this 7th day of ~~August~~ September, 2000, before me Lori Dunn, the undersigned Notary Public, personally appeared LORI ANN EKINS DUNN, personally known to me, who acknowledged to me that she executed this document as Trustee of the SHIRL L. EKINS FAMILY IRREVOCABLE TRUST, on behalf of the trust, and acknowledged to me that the trust executed this document for the purposes set forth herein.

Witness my hand and official seal.



Sandra Kay Mackintosh
Notary Public
Residing in Salt Lake County, Utah

STATE OF UTAH)

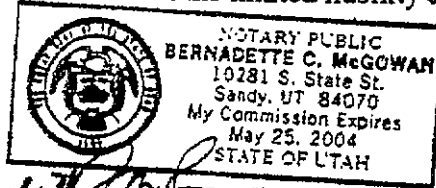
:SS

ENT 102458:2000 PG 457 of 480

COUNTY OF _____)

On this 31st day of August, 2000, before me, BERNADETTE MCGOWAN, the undersigned Notary Public, personally appeared DON LARSEN, personally known to me, and acknowledged that he is the MANAGING MEMBER of UTAH S.H.O.P., LLC, and further acknowledged that this document was executed on behalf of the limited liability company named herein for the purposes set forth herein.

Witness my hand and official seal.



Bernadette McGowan
Notary Public, State of Utah
Residing in UTAH

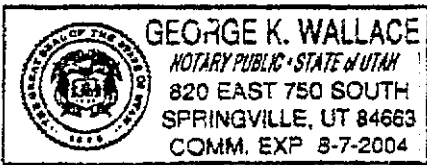
STATE OF UTAH)

:SS

COUNTY OF Utah)

On this 1st day of September, 2000, before me, George K. Wallace, the undersigned Notary Public, personally appeared DARLENE KAY, personally known to me who acknowledged to me that she executed this document as Trustee of the Daryl J. Kay Family Trust for the purposes set forth herein.

Witness my hand and official seal.



George K. Wallace
Notary Public
Residing in Springville, Utah

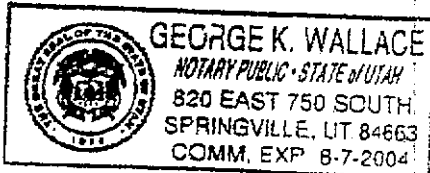
STATE OF UTAH)

:SS

COUNTY OF Utah)

On this 1st day of September, 2000, before me, George K. Wallace, the undersigned Notary Public, personally appeared DARYL J. KAY, personally known to me who acknowledged to me that he executed this document as Trustee of the Daryl J. Kay Family Trust for the purposes set forth herein.

Witness my hand and official seal.



George K. Wallace

Notary Public
Residing in Springville, Utah

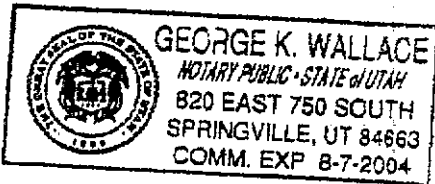
STATE OF UTAH)
COUNTY OF Utah)

: ss.

ENT 102458:2000 PG 458 of 480

On this 31st day of August, 2000, before me, George K. Wallace, the undersigned Notary Public, personally appeared COY MORGAN, personally known to me who acknowledged to me that she executed this document for the purposes set forth herein.

Witness my hand and official seal.



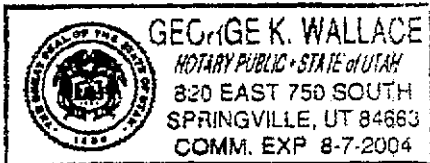
George K. Wallace
Notary Public
Residing in Springville, Utah

STATE OF UTAH)
COUNTY OF Utah)

: ss.

On this 31st day of August, 2000, before me, George K. Wallace the undersigned Notary Public, personally appeared WILLIS H. MORGAN, personally known to me who acknowledged to me that he executed this document for the purposes set forth herein.

Witness my hand and official seal.



George K. Wallace
Notary Public
Residing in Springville, Utah

STATE OF UTAH

COUNTY OF Salt Lake

)
: ss.
)

ENT 102458:2000 PG 459 of 480

On this 31st day of October, 2000, before me, Michelle Barnot, the undersigned Notary Public, personally appeared David J. Terry, personally known to me to be the Director of the STATE OF UTAH, ACTING THROUGH THE SCHOOL AND INSTITUTIONAL TRUST LAND ADMINISTRATION, on behalf of the State of Utah named herein, and acknowledged to me that the State of Utah executed it. Witness my hand and official seal.



Michelle Lee Barnot
Notary/Public
Residing in SLE, UT

EXHIBIT A

ENT 102458:2000 PG-460 of 480

**LEGAL DESCRIPTION OF
SUMMIT RIDGE PROJECT AREA**

EXHIBIT A
(Entire Summit Ridge Project Area)

ENT 102458:2000 PG 461 of 480

Property situated in Utah and Juab Counties in the State of Utah and more particularly described as follows:

WEST PARCEL

Beginning at the Southeast Corner of Section 16, Township 10 South, Range 1 East, Salt Lake Base & Meridian; thence S89°46'12"W along the Section line 2621.27 feet to the South ¼ Corner of Section 16; thence S89°46'13"W along the Section line 2621.01 feet to the Southwest Corner of Section 16; thence N0°33'02"W along the Section line 2677.35 feet to the West ¼ Corner of Section 16; thence N4°36'19"W along the Section line 2643.61 feet to the Southwest Corner of Section 9; thence N0°56'29"W along the Section line 2627.55 feet to the West ¼ Corner of Section 9; thence N0°54'43"W along the Section line 2629.64 feet to the Southwest Corner of Section 4; thence N0°11'38"W along the Section line 2684.79 feet to the West ¼ Corner of Section 4; thence N89°23'49"E along the ¼ Section line 2656.93 feet to the Center of Section 4; thence S0°12'46"E along the ¼ Section line 2640.84 feet to the North ¼ Corner of Section 9; thence N89°20'52"E along the Section line 2692.74 feet to the Southwest Corner of Section 3; thence N0°40'50"W along the Section line 1319.24 feet; thence N89°49'45"E 1316.48 feet; thence S0°35'46"E 441.35 feet; thence N89°42'00"E along a fenceline 600.00 feet; thence N89°43'00"E along a fenceline 866.00 feet; thence S89°39'00"E 119.27 feet to the westerly right-of-way line of the Union Pacific Railroad; thence Southwesterly along the arc of a 1965.00 foot radius non-tangent curve (radius bears: S57°42'49"E) 499.98 feet through a central angle of 14°34'42" (chord: S24°59'50"W 498.63 feet); thence S89°03'00"W 52.70 feet; thence Southwesterly along the arc of a 2015.00 foot radius non-tangent curve (radius bears: S72°46'17"E) 447.70 feet through a central angle of 12°43'48" (chord: S10°51'49"W 446.77 feet); thence S89°55'46"E along the Section line 50.15 feet to a point located N89°55'46"W 36.08 feet from the North ¼ Corner of Section 10; thence Southwesterly along the arc of a 1965.00 foot radius non-tangent curve (radius bears: S85°23'19"E) 107.28 feet through a central angle of 3°07'41" (chord: S3°02'51"W 107.27 feet); thence S1°29'00"W 377.70 feet; thence along the arc of a 2855.00 foot radius curve to the right 322.59 feet through a central angle of 6°28'26" (chord: S4°43'13"W 322.42 feet); thence N86°30'00"W 30.09 feet; thence Southwesterly along the arc of a 2825.00 foot radius non-tangent curve (radius bears: N81°59'43"W) 495.91 feet through a central angle of 10°03'28" (chord: S13°02'01"W 495.27 feet); thence S18°03'45"W 60.75 feet, the previous 10 (ten) courses along said right-of-way; thence West 1059.13 feet; thence South 2,640.00 feet; thence East 626.87 feet to the westerly right-of-way line of the Union Pacific Railroad; thence N87°51'23"E 200.39 feet to the easterly right-of-way of said Railroad; thence S1°26'00"W along said right-of-way 5371.43 feet; thence N64°07'19"W 67.13 feet; thence N61°08'00"W 47.10 feet; thence N60°48'41"W 83.05 feet; thence N62°24'35"W 26.28 feet to said westerly right-of-way; thence N62°24'35"W 179.92 feet; thence N67°55'10"W 285.97 feet; thence N76°39'17"W 140.80 feet; thence S87°08'15"W 80.10 feet; thence N68°32'14"W 113.09 feet; thence N67°00'36"W 48.34 feet; thence N62°08'32"W 94.16 feet; thence N61°34'44"W 48.32 feet; thence N41°02'50"W 90.99 feet; thence N45°34'02"W 89.28 feet; thence N33°28'51"W 82.55 feet; thence N33°17'14"W 117.98 feet; thence N35°51'49"W 155.33 feet; thence N31°19'11"W 201.03 feet; thence N36°31'35"W 396.51 feet; thence N31°23'47"W 67.52 feet; thence N89°42'18"W along the Section line 62.48 feet to the East ¼ Corner of Section 16; thence S1°26'07"E along the Section line 2725.41 feet to the point of beginning.

Contains: 1,898.82 acres

EAST PARCEL

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Beginning at a point located $N0^{\circ}05'18''W$ along the Section line 662.03 feet from the Southwest Corner of Section 11, Township 10 South, Range 1 East, Salt Lake Base & Meridian; thence $N89^{\circ}23'55''E$ 1322.56 feet; thence $S0^{\circ}22'12''E$ along the $1/16^{\text{th}}$ Section (40 acre) line 166.00 feet to the westerly right-of-way line of a Interstate 15 frontage road; thence Southwesterly along the arc of an 1800.00 foot radius non-tangent curve (radius bears: $N58^{\circ}10'46''W$) 582.02 feet through a central angle of $18^{\circ}31'35''$ (chord: $S41^{\circ}05'02''W$ 579.49 feet; thence $S61^{\circ}59'00''W$ 337.00 feet to a right-of-way marker; thence $S71^{\circ}41'52''W$ 286.24 feet; thence Southwesterly along the arc of an 897.72 foot radius non-tangent curve (radius bears: $S22^{\circ}17'42''E$) 1096.78 feet through a central angle of $70^{\circ}00'00''$ (chord: $S32^{\circ}42'18''W$ 1029.83 feet) to a right-of-way marker; thence $S2^{\circ}17'42''E$ 234.82 feet; thence along the arc of an 874.16 foot radius curve to the left 503.48 feet through a central angle of $33^{\circ}00'00''$ (chord: $S14^{\circ}12'18''W$ 496.55 feet) to a right-of-way marker; thence $S30^{\circ}42'18''W$ 1526.35 feet; thence $S30^{\circ}15'38''W$ 686.95 feet, the previous 8 (eight) courses along said frontage road; thence $N89^{\circ}56'17''W$ 928.35 feet; thence $S48^{\circ}27'55''W$ 315.74 feet; thence $N0^{\circ}06'19''W$ 633.53 feet; thence $N89^{\circ}06'00''W$ 686.49 feet to the easterly right-of-way line of the Union Pacific Railroad; thence $N1^{\circ}26'00''E$ along said right-of-way 4566.13 feet; thence $S89^{\circ}07'43''E$ 492.94 feet to a point on the $1/4$ Section line of Section 10; thence $N0^{\circ}19'10''W$ along the $1/4$ Section line 152.42 feet; thence $S89^{\circ}59'30''E$ along the extension of, and along an existing fenceline, 2665.72 feet to a point on the Section line; thence $S0^{\circ}05'18''E$ along the Section line 819.82 feet to the point of beginning.

Contains: 351.06 acres

When Recorded, Return To:
Diane H. Banks, Esq.
Fabian & Clendenin
215 S. State St., #1200
Salt Lake City, UT 84111

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**MASTER DECLARATION OF COVENANTS, CONDITIONS AND
RESTRICTIONS AND RESERVATION OF EASEMENTS
FOR
SUMMIT RIDGE
A PLANNED COMMUNITY DEVELOPMENT**

in

Utah and Juab Counties, Utah

THIS MASTER DECLARATION OF COVENANTS, CONDITIONS AND RESTRICTIONS AND RESERVATION OF EASEMENTS FOR SUMMIT RIDGE (the "Master Declaration") is made on this 6 day of December, 2000, by SUMMIT RIDGE DEVELOPMENT, LLC, a Utah limited liability company ("Declarant") and is approved and accepted by Grantors, as hereafter defined.

RECITALS:

A. Declarant has entered into option or contractual agreements for the purchase of certain real property from South County Development, L.C., a Utah limited liability company ("South County"), the Shirl L. Ekins Family Irrevocable Trust (the "Ekins Family Irrevocable Trust") and the State of Utah acting through the School and Institutional Trust Lands Administration ("SITLA"). South County, the Ekins Family Irrevocable Trust and SITLA may hereafter be referred to together as "Grantors." The real property owned by Grantors and subject to this Declaration (the "Grantor Property") is more particularly described on Exhibit A-1, attached hereto and incorporated herein by this reference

B. The property described on the attached Exhibit A-2 is presently owned by (i) UTAH S.H.O.P., LLC, a Utah limited liability company (the "Shop Company"), (ii) Darlene and Daryl J. Kay, Trustees of the Daryl J. Kay Family Trust (the "Kay Family Trust"), and (iii)

the Shirl L. Ekins Family Trust (the "Ekins Family Trust"), each parcel of which is more particularly described on Exhibit A-2, attached hereto and incorporated herein by this reference and all of which may together hereafter be referred to as the "Additional Property". The owners of the Additional Property may hereafter together be referred to as the "Additional Property Owners". The Additional Property Owners agree to subject the Additional Property to this Master Declaration.

C. Willis H. and Coy Morgan (the "Morgan") own certain undevelopable property located in Utah County, State of Utah, as more particularly described on Exhibit A-3 attached hereto and incorporated herein by this reference (the "Morgan Property"), which Morgans have agreed to subject to this Master Declaration.

D. The Grantor Property, the Additional Property and the Morgan Property may hereafter be collectively referred to together as the ("Property"), and more particularly described on Exhibit A attached hereto and incorporated herein by this reference.

E. A planned community development known as SUMMIT RIDGE (the "Project") will be developed on the Property as shown on the Summit Ridge Development Plan attached as Exhibit B and incorporated by this reference. The Project contains neighborhood areas and commercial areas and will include a mixture of single-family, multi-family, commercial, industrial and recreational uses. The Project also contains Common Elements, some of which may be used and enjoyed by the general public.

F. In furtherance of a common plan of development for the Project, Declarant, Grantors, the Additional Property Owners and Morgan, intend to adopt these master covenants, conditions and restrictions affecting the Property and to reserve easements across certain portions of the Property for the benefit of other portions of the Property and any After-Acquired Property. Grantors agree to convey the Grantor Property, each pursuant to its respective agreement with Declarant, subject to these master covenants, conditions, and restrictions, and subject to and together with such easements herein provided, all of which shall run with the title to the Property.

G. Declarant has created the Summit Ridge Master Association to which Declarant in due course will delegate and assign (i) the powers of owning, maintaining and administering the Common Elements, (ii) the duties of administering and enforcing this Master Declaration, and (iii) the duties of collecting and disbursing the assessments and charges hereinafter created in connection with the operation, maintenance, repair and replacement of the Common Elements and the functions and obligations of the Master Association created hereunder.

H. Declarant or the Additional Property Owners may also create separate Condominium Associations covering the multi-family, commercial and industrial portions of the Project, which Condominium Associations will maintain common areas (separate from the Common Elements) within the boundaries of those projects, and provide for the management and operation of the Condominium Association, administer and enforce the terms of any Condominium Declaration, and levy and collect assessments, including assessments of the Master Association allocated to the Condominium Association by this Master Declaration.

ARTICLE 1

General

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1.1 General Purposes. Declarant and the Additional Property Owners intend to develop the Property as a community to be known as Summit Ridge which will contain neighborhood and commercial areas which will include a mixture of single-family, multi-family, commercial, industrial, and recreational uses. Declarant and the Additional Property Owners intend that this Master Declaration establish and provide for the continued maintenance of the Project as an attractive and desirable community.

1.2 Densities and Entitlements. The densities and entitlements for the Project are generally defined in the Annexation and Development Agreement between Declarant, Grantors, the Additional Property Owners and Morgan (all together, the "Land Owners") and the City of Santaquin, dated _____, 2000 which sets forth the right to develop the Project to include up to Three Thousand Three Hundred Twenty-Two (3,322) residential units, plus 1,800,000 square feet of commercial and industrial buildings. Additional residential units and commercial development may be approved for After-Acquired Property. More particularly, and subject to possible reallocations of residential density, the Project will consist generally of the following:

- (a) Single Family Residential Detached Homes;
- (b) Multi-Family Uses; and
- (c) Commercial Uses.

1.3 After-Acquired Property. Subject to any approvals required from the City, Declarant reserves the right to subject the After-Acquired Property to this Master Declaration by the recordation of a supplemental declaration. No amendment to this Master Declaration will be required to effect such action. Declarant shall identify in the supplemental declaration the number of additional Lots and Units to be added to the Project, the number of votes to be allocated to the After-Acquired Property and the number of Assessment Units to be allocated to the After-Acquired Property. Upon recordation of the supplemental declaration, the subject After-Acquired Property shall be deemed added to the Property and the number of Lots, Units, votes and Assessment Units shall be automatically increased to include the After-Acquired Property's Lots, Units and other items for purposes of this Master Declaration. The supplemental declaration may modify any of the covenants, conditions and restrictions otherwise applicable to the Property in the supplemental declaration where such changes are deemed necessary, in the discretion of the Declarant, to address a unique condition affecting or relating to the After-Acquired Property that is the subject of the supplemental declaration or to more fairly allocate the benefits and obligations of membership within the Master Association.

1.4 Master Association and Neighborhood Associations. Declarant has created the Summit Ridge Master Association as a Utah non-profit corporation. The members of the Master Association will be Declarant, the Owners of Lots and Condominium Associations. The votes

shall be allocated among those Members as set forth in Section 3.14 below. Declarant or the Owners of Lots in any Neighborhood may also create a Voluntary Neighborhood Association of Lot Owners but such association shall not have any voting rights hereunder. Declarant intends to delegate and assign the power of owning, maintaining and administering the Common Elements and the duties of administering and enforcing this Master Declaration and of collecting and disbursing the assessments and charges hereinafter created to the Master Association.

1.5 Dedication. In order to further the general purposes stated above, Declarant, the Land Owners and Morgans hereby declare that all of the Property, and any of the After-Acquired Property hereafter made subject to this Master Declaration by the recordation of a supplemental declaration, shall at all times be owned, held, sold, conveyed, occupied, used, and enjoyed subject to the provisions of this Master Declaration and to the covenants, conditions, restrictions, equitable servitudes, reservations, easements, assessments, charges, and liens provided, referred to or incorporated herein, all of which shall run with the Property (and any of the After-Acquired Property made subject hereto), and all of which shall burden, benefit, and be binding upon Declarant Grantor, the Land Owners and Morgans and all other persons or entities having any right, title or interest in the Property (and any of the After-Acquired Properties made subject hereto), or any portion thereof, and their respective successors, assigns, heirs, devisees and personal representatives.

1.6 Right to Develop. The foregoing notwithstanding, no provision of this Master Declaration is intended or shall be construed to prevent or limit the rights to develop the Project and to exercise the rights reserved by Declarant and the Additional Property Owners as hereinafter provided.

ARTICLE 2

Definitions

2.1 Unless otherwise expressly provided herein, capitalized words and phrases used in this Master Declaration shall have the following meanings:

“Additional Property” means that property within the Summit Ridge Project Area described on the attached Exhibit A-2.

“Additional Property Owners” means the owner of any parcel of Additional Property as set forth in Recital B above, as such group may be modified by subsequent transfer of any parcel of Additional Property (except an individual lot sale).

“After-Acquired Property” means any parcel or parcels of real property other than property in the Project acquired by Declarant after the execution of this Declaration which are, at the date of this Declaration, adjacent to the Summit Ridge Project Area.

“Annexation and Development Agreement” shall mean that certain agreement described in Section 1.2.

EXHIBIT A

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**LEGAL DESCRIPTION OF
THE PROPERTY**

EXHIBIT A
(Entire Summit Ridge Project Area)

Property situated in Utah and Juab Counties in the State of Utah and more particularly described as follows:

WEST PARCEL,

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Beginning at the Southeast Corner of Section 16, Township 10 South, Range 1 East, Salt Lake Base & Meridian; thence S89°46'12"W along the Section line 2621.27 feet to the South ¼ Corner of Section 16; thence S89°46'13"W along the Section line 2621.01 feet to the Southwest Corner of Section 16; thence N0°33'02"W along the Section line 2677.35 feet to the West ¼ Corner of Section 16; thence N4°36'19"W along the Section line 2643.61 feet to the Southwest Corner of Section 9; thence N0°56'29"W along the Section line 2627.55 feet to the West ¼ Corner of Section 9; thence N0°54'43"W along the Section line 2629.64 feet to the Southwest Corner of Section 4; thence N0°11'38"W along the Section line 2684.79 feet to the West ¼ Corner of Section 4; thence N89°23'49"E along the ¼ Section line 2656.93 feet to the Center of Section 4; thence S0°12'46"E along the ¼ Section line 2640.84 feet to the North ¼ Corner of Section 9; thence N89°20'52"E along the Section line 2692.74 feet to the Southwest Corner of Section 3; thence N0°40'50"W along the Section line 1319.24 feet; thence N89°49'45"E 1316.48 feet; thence S0°35'46"E 441.35 feet; thence N89°42'00"E along a fenceline 600.00 feet; thence N89°43'00"E along a fenceline 866.00 feet; thence S89°39'00"E 119.27 feet to the westerly right-of-way line of the Union Pacific Railroad; thence Southwesterly along the arc of a 1965.00 foot radius non-tangent curve (radius bears: S57°42'49"E) 499.98 feet through a central angle of 14°34'42" (chord: S24°59'50"W 498.63 feet); thence S89°03'00"W 52.70 feet; thence Southwesterly along the arc of a 2015.00 foot radius non-tangent curve (radius bears: S72°46'17"E) 447.70 feet through a central angle of 12°43'48" (chord: S10°51'49"W 446.77 feet); thence S89°55'46"E along the Section line 50.15 feet to a point located N89°55'46"W 36.08 feet from the North ¼ Corner of Section 10; thence Southwesterly along the arc of a 1965.00 foot radius non-tangent curve (radius bears: S85°23'19"E) 107.28 feet through a central angle of 3°07'41" (chord: S3°02'51"W 107.27 feet); thence S1°29'00"W 377.70 feet; thence along the arc of a 2855.00 foot radius curve to the right 322.59 feet through a central angle of 6°28'26" (chord: S4°43'13"W 322.42 feet); thence N86°30'00"W 30.09 feet; thence Southwesterly along the arc of a 2825.00 foot radius non-tangent curve (radius bears: N81°59'43"W) 495.91 feet through a central angle of 10°03'28" (chord: S13°02'01"W 495.27 feet); thence S18°03'45"W 60.75 feet, the previous 10 (ten) courses along said right-of-way; thence West 1059.13 feet; thence South 2,640.00 feet; thence East 626.87 feet to the westerly right-of-way line of the Union Pacific Railroad; thence N87°51'23"E 200.39 feet to the easterly right-of-way of said Railroad; thence S1°26'00"W along said right-of-way 5371.43 feet; thence N64°07'19"W 67.13 feet; thence N61°08'00"W 47.10 feet; thence N60°48'41"W 83.05 feet; thence N62°24'35"W 26.28 feet to said westerly right-of-way; thence N62°24'35"W 179.92 feet; thence N67°55'10"W 285.97 feet; thence N76°39'17"W 140.80 feet; thence S87°08'15"W 80.10 feet; thence N68°32'14"W 113.09 feet; thence N67°00'36"W 48.34 feet; thence N62°08'32"W 94.16 feet; thence N61°34'44"W 48.32 feet; thence N41°02'50"W 90.99 feet; thence N45°34'02"W 89.28 feet; thence N33°28'51"W 82.55 feet; thence N33°17'14"W 117.98 feet; thence N35°51'49"W 155.33 feet; thence N31°19'11"W 201.03 feet; thence N36°31'35"W 396.51 feet; thence N31°23'47"W 67.52 feet; thence N89°42'18"W along the Section line 62.48 feet to the East ¼ Corner of Section 16; thence S1°26'07"E along the Section line 2725.41 feet to the point of beginning.

Contains: 1,898.82 acres

EAST PARCEL

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Beginning at a point located $N0^{\circ}05'18''W$ along the Section line 662.03 feet from the Southwest Corner of Section 11, Township 10 South, Range 1 East, Salt Lake Base & Meridian; thence $N89^{\circ}23'55''E$ 1322.56 feet; thence $S0^{\circ}22'12''E$ along the $1/16^{\text{th}}$ Section (40 acre) line 166.00 feet to the westerly right-of-way line of a Interstate 15 frontage road; thence Southwesterly along the arc of an 1800.00 foot radius non-tangent curve (radius bears: $N58^{\circ}10'46''W$) 582.02 feet through a central angle of $18^{\circ}31'35''$ (chord: $S41^{\circ}05'02''W$ 579.49 feet; thence $S61^{\circ}59'00''W$ 337.00 feet to a right-of-way marker; thence $S71^{\circ}41'52''W$ 286.24 feet; thence Southwesterly along the arc of an 897.72 foot radius non-tangent curve (radius bears: $S22^{\circ}17'42''E$) 1096.78 feet through a central angle of $70^{\circ}00'00''$ (chord: $S32^{\circ}42'18''W$ 1029.83 feet) to a right-of-way marker; thence $S2^{\circ}17'42''E$ 234.82 feet; thence along the arc of an 874.16 foot radius curve to the left 503.48 feet through a central angle of $33^{\circ}00'00''$ (chord: $S14^{\circ}12'18''W$ 496.55 feet) to a right-of-way marker; thence $S30^{\circ}42'18''W$ 1526.35 feet; thence $S30^{\circ}15'38''W$ 686.95 feet, the previous 8 (eight) courses along said frontage road; thence $N89^{\circ}56'17''W$ 928.35 feet; thence $S48^{\circ}27'55''W$ 315.74 feet; thence $N0^{\circ}06'19''W$ 633.53 feet; thence $N89^{\circ}06'00''W$ 686.49 feet to the easterly right-of-way line of the Union Pacific Railroad; thence $N1^{\circ}26'00''E$ along said right-of-way 4566.13 feet; thence $S89^{\circ}07'43''E$ 492.94 feet to a point on the $1/4$ Section line of Section 10; thence $N0^{\circ}19'10''W$ along the $1/4$ Section line 152.42 feet; thence $S89^{\circ}59'30''E$ along the extension of, and along an existing fence line, 2665.72 feet to a point on the Section line; thence $S0^{\circ}05'18''E$ along the Section line 819.82 feet to the point of beginning.

Contains: 351.06 acres

EXHIBIT A-1

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Property situated in Utah County, Utah and more particularly described as follows:

South County Development, LLC:

PARCEL 1**(WEST OF RAILROAD)**

A portion of Sections 9, 10, 15, & 16, Township 10 South, Range 1 East, Salt Lake Base & Meridian, more particularly described as follows:

Beginning at the West $\frac{1}{4}$ Corner of Section 9, T10S, R1E, S.L.B. & M.; thence $N0^{\circ}54'43''W$ along the Section line 2629.64 feet to the Northwest Corner of said Section; thence $N88^{\circ}26'59''E$ along the Section line 2658.47 feet to the North $\frac{1}{4}$ Corner of said Section; thence $N89^{\circ}20'52''E$ along the Section line 2692.74 feet to the Northeast Corner of said Section; thence $S1^{\circ}41'57''E$ along the Section line 1311.72 feet; thence $S89^{\circ}05'26''W$ 674.56 feet; thence $S1^{\circ}38'14''E$ 1314.72 feet to the $\frac{1}{4}$ Section line; thence $N88^{\circ}50'04''E$ along the $\frac{1}{4}$ Section line 675.94 feet to the East $\frac{1}{4}$ Corner of said Section 9; thence $S89^{\circ}29'08''E$ along the $\frac{1}{4}$ Section line 1220.71 feet to a fence line; thence $S0^{\circ}19'30''E$ 169.20 feet; thence $S2^{\circ}37'00''E$ 91.00 feet; thence $S0^{\circ}38'00''E$ 1020.00 feet; thence $S1^{\circ}26'00''E$ 90.31 feet; thence $N89^{\circ}50'00''E$ 184.95 feet; thence $N89^{\circ}41'00''E$ 456.00 feet to the westerly right-of-way line of the Union Pacific Railroad, the previous (six) courses along said fence line; thence $S1^{\circ}26'00''W$ along said Railroad 5246.31 feet; thence $N62^{\circ}24'35''W$ 179.92 feet; thence $N67^{\circ}55'10''W$ 285.97 feet; thence $N76^{\circ}39'17''W$ 140.80 feet; thence $S87^{\circ}08'15''W$ 80.10 feet; thence $N68^{\circ}32'14''W$ 113.09 feet; thence $N67^{\circ}00'36''W$ 48.34 feet; thence $N62^{\circ}08'32''W$ 94.16 feet; thence $N61^{\circ}34'44''W$ 48.32 feet; thence $N41^{\circ}02'50''W$ 90.99 feet; thence $N45^{\circ}34'02''W$ 89.28 feet; thence $N33^{\circ}28'51''W$ 82.55 feet; thence $N33^{\circ}17'14''W$ 117.98 feet; thence $N35^{\circ}51'49''W$ 155.33 feet; thence $N31^{\circ}19'11''W$ 201.03 feet; thence $N36^{\circ}31'35''W$ 396.51 feet; thence $N31^{\circ}23'47''W$ 67.52 feet; thence $N89^{\circ}42'03''W$ 62.48 feet to the East $\frac{1}{4}$ Corner of Section 16; thence $S89^{\circ}14'48''W$ along the $\frac{1}{4}$ Section line 1315.10 feet; thence $N0^{\circ}49'29''W$ along the $\frac{1}{16}^{\text{th}}$ Section (40 acre) line 2646.18 feet; thence $S89^{\circ}05'31''W$ along the Section line 1352.37 feet to the North $\frac{1}{4}$ Corner of said Section 16; thence $N1^{\circ}27'13''W$ along the $\frac{1}{4}$ Section line 2642.17 feet to the Center $\frac{1}{4}$ Corner of Section 9; thence $S88^{\circ}50'04''W$ along the $\frac{1}{4}$ Section line 2683.37 feet to the point of beginning.

Contains: 780.17 acres

PARCEL 2
(WEST OF RAILROAD)

A portion of Sections 3 & 10, Township 10 South, Range 1 East, Salt Lake Base & Meridian, more particularly described as follows:

Beginning at the Southwest Corner of Section 3, T10S, R1E, S.L.B. & M.; thence N0°40'50"W along the Section line 1319.24 feet; thence N89°49'45"E 1316.48 feet; thence S0°35'46"E 441.35 feet; thence N89°42'00"E along a fence line 600.00 feet; thence N89°43'00"E along a fence line 866.00 feet; thence S89°39'00"E along a fence line 119.27 feet to the westerly right-of-way line of the Union Pacific Railroad; thence Southwesterly along the arc of a 1965.00 foot radius non-tangent curve (radius bears: S57°42'49"E) 499.98 feet through a central angle of 14°34'42" (chord: S24°59'50"W 498.63 feet); thence S89°03'00"W 52.70 feet; thence Southwesterly along the arc of a 2015.00 foot radius non-tangent curve (radius bears: S72°46'17"E) 447.70 feet through a central angle of 12°43'48" (chord: S10°51'49"W 446.77 feet); thence S89°55'46"E along the Section line 50.15 feet to a point located N89°55'46"W along the Section line 36.08 feet from the S1/4 Corner of said Section 3; thence Southwesterly along the arc of a 1965.00 foot radius non-tangent curve (radius bears: S85°23'19"E) 107.28 feet through a central angle of 3°07'41" (chord: S3°02'51"W 107.27 feet); thence S1°29'00"W 377.70 feet; thence along the arc of a 2855.00 foot radius curve to the right 322.59 feet through a central angle of 6°28'26" (chord: S4°43'13"W 322.42 feet); thence N86°30'00"W 30.09 feet; thence Southwesterly along the arc of a 2825.00 foot radius non-tangent curve (radius bears: N81°59'43"W) 495.91 feet through a central angle of 10°03'28" (chord: S13°02'01"W 495.27 feet); thence S18°03'45"W 50.37 feet, the previous 10 (ten) courses along said railroad; thence N87°02'00"W along a fence line 1058.09 feet; thence N1°00'24"W 1281.58 feet to the Section line; thence N89°55'46"W along the Section line 1314.64 feet to the point of beginning.

Contains: 104.11 acres

PARCEL 3
(BETWEEN I-15 & RAILROAD)

Beginning at a point located N0°05'18"W along the Section line 662.03 feet from the Southwest Corner of Section 11, Township 10 South, Range 1 East, Salt Lake Base & Meridian; thence N89°23'55"E 1322.56 feet; thence S0°22'12"E along the 1/16th Section (40 acre) line 166.00 feet to the westerly right-of-way line of a Interstate 15 frontage road; thence Southwesterly along the arc of an 1800.00 foot radius non-tangent curve (radius bears: N58°10'46"W) 582.02 feet through a central angle of 18°31'35" (chord: S41°05'02"W 579.49 feet); thence S61°59'00"W 337.00 feet to a right-of-way marker; thence S71°41'52"W 286.24 feet; thence Southwesterly along the arc of an 897.72 foot radius non-tangent curve (radius bears: S22°17'42"E) 1096.78 feet through a central angle of 70°00'00" (chord: S32°42'18"W 1029.83 feet) to a right-of-way marker; thence S2°17'42"E 234.82 feet; thence along the arc of an 874.16 foot radius curve to the left 503.48 feet through a central angle of 33°00'00" (chord: S14°12'18"W 496.55 feet) to a right-of-way marker; thence S30°42'18"W 1109.81 feet, the previous 7 (seven) courses along said frontage road; thence West 1731.23 feet; thence S0°06'20"E 526.23 feet; thence N89°06'00"W 680.97 feet to the easterly right-of-way line of the Union Pacific Railroad; thence N1°26'00"E along said right-of-way 4566.13 feet; thence S89°07'43"E 492.94 feet to a point on the ¼ Section line of Section 10; thence S0°19'10"E along the ¼ Section line 352.32 feet; thence N89°43'53"E 2663.69 feet to a point on the Section line; thence S0°05'18"E along the Section line 327.97 feet to the point of beginning.

Contains: 288.45 acres

That certain property located in the State of Utah, County of Utah and more particularly described as:

PARCEL 1

S 1/2 of SW 1/4 of Section 4, Township 10 South, Range 1 East, SLM

PARCEL 2

W 1/2 NW 1/4 Sec 10, T 10S, R1E, SLM, 80 Acres

PARCEL 3

East 1/2 of the SE 1/4 of the NE 1/4 of Section 9, T10S, R1E, SLM; Area 20 acres

SITLA

That certain property located in the State of Utah, Counties of Utah and Juab, and more particularly described as:

All of Section 16, Township 10 South, Range 1 East, excepting the East 1/2 of the Northeast 1/4, SLM

EXHIBIT A-2

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Utah S.H.O.P., L.L.C.

That certain property located in the State of Utah, County of Utah and more particularly described as:

Commencing at a point located South 2711.86 feet and West 868.97 feet from the Northeast corner of Section 15, Township 10 South, Range 1 East, SLM, Utah Central Zone; thence South 31 deg. 22'44" West 714.78 feet; thence South 28 deg. 28'47" West 388.22 feet; thence North 89 deg. 56' 17" West 924.06 feet; thence South 48 deg. 27'55" West 323.10 feet; thence North 00 deg. 06'20" West 1164.73 feet; thence East 1725.37 feet to the point of beginning.

Daryl J. Kay and Darlene Kay as Trustees of the Daryl J. Kay Family Trust

That certain property located in the State of Utah, County of Utah and more particularly described as:

Commencing North 15 CH from the Southeast Corner of Section 10, Township 10 South Range 1 East, Salt Lake Base & Meridian; thence North 7.5 CH; thence West 40 Ch; thence South 7.5 CH; thence East 40 CH to Beginning.

The Shirl L. Ekins Family Trust

That certain property located in the State of Utah, County of Utah and more particularly described as:

SLM The North ½ of the SW ¼ of Section 4, Township 10 South Range 1 East,

SLM The East ½ of the SW ¼ of Section 9, Township 10 South Range 1 East,

EXHIBIT A-3

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Morgan

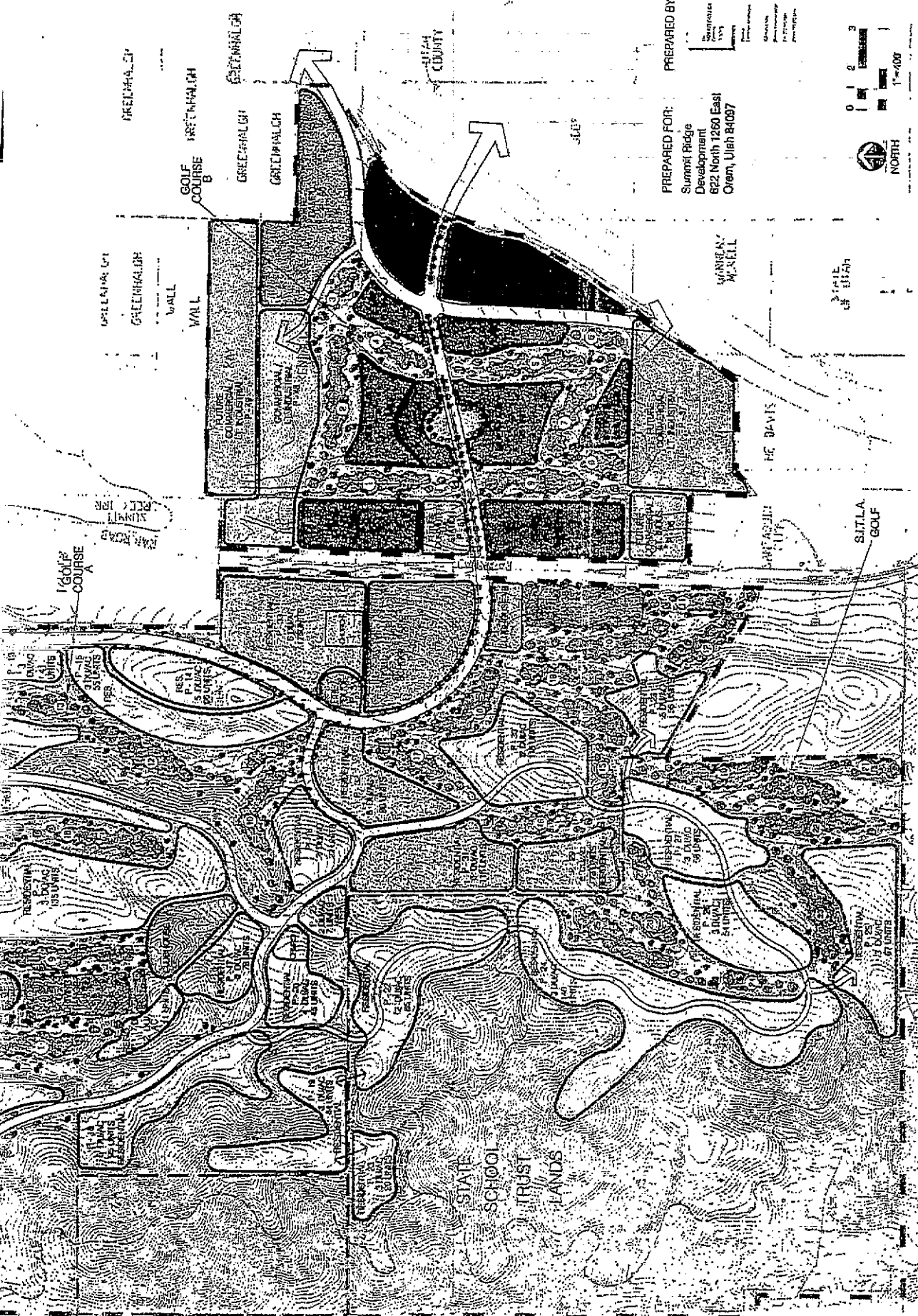
That certain property located in the State of Utah, County of Utah and more particularly described as:

The West ½ of the SW ¼ of Section 9, Township 10 South Range 1 East,
SLM (containing 81.4 acres)

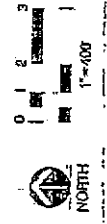
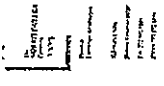
EXHIBIT B

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SUMMIT RIDGE DEVELOPMENT PLAN



PREPARED BY:
 Summit Bridge
 Development
 622 North 1250 East
 Orem, Utah 84057



AUGUST 25, 1999
 MAY 24, 2000 Revised
 JUNE 5, 2000 Revised

EXHIBIT C

**LEGAL DESCRIPTION OF
THE ANNEXED PARCELS**

EXHIBIT C

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The land previously annexed into Santaquin City land located in the Summit Ridge Project Area situated in the State of Utah, County of Utah described as follows:

Beginning at a point located South 231.03 feet and West 4870.30 west from the Northeast Corner of Section 14, Township 10 South, Range 1 East, Salt Lake Base and Meridian; thence $S71^{\circ}41'13''W$ 19.42 feet; thence along the arc of an 898.51 foot radius curve to the left 1097.74 feet (chord: $S32^{\circ}40'23''W$ 1030.73 feet); thence $S02^{\circ}19'37''E$ 235.03 feet; thence along the arc of an 874.93 foot radius curve to the right 503.92 feet (chord: $S14^{\circ}10'23''W$ 496.99 feet); thence $S30^{\circ}17'48''W$ 1130.46 feet; thence $S31^{\circ}22'44''W$ 714.78 feet; thence $S28^{\circ}28'47''W$ 388.22 feet; thence $N89^{\circ}56'17''W$ 924.06 feet; thence $S48^{\circ}27'55''W$ 323.10 feet; thence $N00^{\circ}06'20''W$ 638.39 feet; thence $N89^{\circ}06'00''W$ 687.24 feet; thence $N01^{\circ}38'36''E$ 585.39 feet; thence $N01^{\circ}19'17''E$ 738.79 feet; thence $N01^{\circ}22'18''E$ 761.59 feet; thence $N01^{\circ}30'09''E$ 1145.78 feet; thence $N01^{\circ}31'42''E$ 424.16 feet; thence $N01^{\circ}19'53''E$ 616.35 feet; thence $N01^{\circ}16'55''E$ 267.85 feet; thence $N01^{\circ}26'54''E$ 26.65 feet; thence $S89^{\circ}07'30''E$ 521.10 feet; thence North 155.26 feet; thence East 2640.00 feet; thence South 797.49 feet; thence East 1353.39 feet; thence South 102.31 feet; thence $S36^{\circ}23'31''W$ 262.97 feet; thence along the arc of a 1223.24 foot radius curve to the right 363.54 feet (chord: $S42^{\circ}41'14''W$ 362.20 feet); thence $S61^{\circ}03'41''W$ 202.76 feet; thence $S67^{\circ}54'59''W$ 411.12 feet to the point of beginning.

Contains: 350.69 acres