1.0 SCOPE

This specification covers the construction and placing of the Tioga Special with chase precast concrete vault toilet building as produced by CXT® Incorporated.

2.0 SPECIFICATIONS

ASTM C33	Concrete Aggregates
ASTM C39	Method of Test for Compressive Strength of Cylindrical Concrete Specimens
ASTM C94	Standard Specification for Ready-Mixed Concrete
ASTM C143	Method of Test for Slump of Concrete
ASTM C150	Standard Specification for Portland Cement
ASTM A185	Standard Specification for Steel Welded Wire Reinforcement, Plain, or Concrete
ASTM C192	Method of Making and Curing Test Specimens in the Laboratory
ASTM C231	Standard Test Method for Air Content of Freshly Mixed Concrete by the Pressure Method
ASTM C309	Standard Specifications for Liquid Membrane-Forming Compounds for Curing Concrete
ASTM C494	Standard Specification for Chemical Admixtures for Concrete
ASTM A615	Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement
ASTM C979	Standard Specification for Pigments for Integrally Colored Concrete
ACI 211.1	Standard Practice for Selecting Proportions for Normal, Heavyweight, and Mass Concrete
ACI 306	Cold Weather Concreting
ACI 318	Building Code Requirements Structural Concrete and Commentary (includes Errata)
PCI MNL 116	Quality Control for Plants and Production of Precast Prestressed Concrete Products

3.0 MANUFACTURER CRITERIA

The manufacturer supplying the requested precast concrete vault facility must meet the following:

A. Manufacturer must be ISO 9001 certified at the time of bid.

B. Manufacturing plant must be PCI certified at the time of bid.

C. Manufacturer must not have defaulted on any contract within the last five (5) years.

D. Manufacturer must provide stamped, engineered drawings prior to acceptance.

E. Manufacturer must be pre-approved prior to bidding.

F. Manufacturer must show four (4) examples of Sweet Smelling Technology designed precast concrete vault toilet facilities produced, installed, and in use as an example of their ability to perform on this contract.

G. Manufacture shall provide a one (1) year warranty.

H. UL 752 Bullet Resistance on 4" thick concrete samples.

Manufacturer meeting these criteria is:

CXT Incorporated
6701 E. Flamingo Avenue, Building 300
Nampa, ID 83687
Phone 800-696-5766

4.0 DESIGN CRITERIA

The Tioga Special with chase has been designed to meet the following criteria. Calculations and engineer's stamped drawings are available, for standard buildings, upon request by the customer and are for their sole and specific use only. The design criteria are to ensure that the vault building not only will withstand the forces of nature listed below but will provide protection from vandalism and other unforeseen hazards. Design criteria include provisions of the 2006 IBC Code.

A. Roof Snow Load
   1. The Tioga Special with chase is designed to withstand a 350 pounds per square foot snow load.

B. Floor Load
   1. The Tioga Special with chase is designed to withstand 400 pounds per square foot floor load.

C. Wind Load
   1. The Tioga Special with chase will withstand the effects of 150 mile per hour (3-second gust) wind exposure C.

D. Earthquake
   1. The Tioga Special with chase will withstand the effects of a seismic design category E earthquake.

E. Sweet Smelling Technology (SST)
   1. Vault buildings incorporate design aspects of SST as outlined by Briar Cook for the U.S. Forest Service.
   2. All wall to floor interior surface seams shall have a minimum 1" radius coving made of high strength grout.
   3. The vault shall have a bottom slope of 1" per foot from under the toilet riser out to the outside cleanout area.
   4. The vault shall have a 24" diameter (minimum) lightweight manhole cover installed to the rear or side of the building.
      a. The manhole cover should be raised, with the surrounding concrete sloped away using a minimum slope of ½" per foot.
   5. The depth of the vault shall be no deeper than 4½' to 5'.
   6. A 12" diameter round pipe will be installed to vent the vault and the pipe shall be raised a minimum of 3' above the highest point of the roof.
      a. Vent pipe shall be straight up from the vault.
   7. There shall be only one vent opening in the building and it shall be placed only on one side of the building (the side that the wind blows against). *In multiple room buildings each restroom will have one vent and one vault.

F. Additional Design Standards

1. The Tioga Special with chase is designed to meet the requirements of the 60" turning radius inside toilet room specified by the American with Disabilities Act Requirements and Uniform Federal Accessibility Standards as of the date of these specification.
2. The Tioga Special with chase has two (2) one-piece full length and width vault unit to support the building, screen area and snow loads evenly. The Tioga Special with chase has a one-piece floor unit to prevent panels that migrate in different direction during periods of freeze/thaw stress.
3. The Tioga Special with chase is an all concrete design with a minimum 3/12 roof pitch.
4. The Tioga Special with chase shall have a minimum 4" wall, 4½" roof, and 5" floor thickness.
5. All wall to floor interior surface seams shall have a minimum 1" radius coving made of high strength grout.

5.0 MATERIALS

A. Concrete - General

1. The concrete mix design will be designed to ACI 211.1 to produce concrete of good workability.
2. Concrete will contain a minimum of 505 pounds of cementitious material per yard. Cement will be a low alkali type I/II or III conforming to ASTM C-150.
3. Coarse aggregates used in the concrete mix design will conform to ASTM C33 with the designated size of coarse aggregate #67.
4. Minimum water/cement ratio will not exceed .45.
5. Air-entraining admixtures will conform to ASTM C260. Water reducing admixtures will conform to ASTM C494, Type A. Other admixtures will not be used without customer approval.

B. Cold Weather Concrete

1. Cold weather concrete placement will be in accordance with ACI 306.
2. Concrete will not be placed if ambient temperature is expected to be below 35ºF. during the curing period unless heat is readily available to maintain the surface temperature of the concrete at least 45ºF.
3. Materials containing frost or lumps of frozen materials will not be used.

C. Hot Weather Concrete

1. The temperature of the concrete will not exceed 95ºF. at the time of placement. When the ambient reaches 90ºF. the concrete will be protected with moist covering.

D. Concrete Reinforcement

1. All reinforcing steel will conform to ASTM A615. All welded wire fabric will conform to ASTM A185.
2. All reinforcement will be new, free of dirt, oil, paint, grease, loose mill scale and loose or thick rust when placed.
3. Details not shown of drawings or specified will be to ACI318.

4. Steel reinforcement will be centered in the cross-sectional area of the walls and will have at least 1¼" of cover on the under surface of the floor.
5. The maximum allowable variation for center-center spacing of reinforcing steel will be ½".
6. Full lengths of reinforcing steel will be used when possible. When splices are necessary on long runs, splices will be alternated from opposite sides of the components for adjacent steel bars. Lap bars #4 or smaller a minimum of 12". Lap bars larger than #4 a minimum of 24 bar diameters.
7. Reinforcing bars will be bent cold. No bars partially embedded in concrete will be field bent unless approved by the customer.

E. Sealers and Curing Compounds
1. Curing compounds, if used, will be colorless, complying with ASTM C309, type I or 1-D.
2. Weatherproofing sealer for exterior of building will be a clear water repellent penetrating sealer.

F. Caulking, Grout, Adhesive and Sealer
1. Caulking service temperatures from -40 ºF to +194ºF.
2. Interior and exterior joints will be caulked with a paintable polyurethane sealant.
3. Grout will be a non-shrink type and will be painted to match the color of surrounding concrete as nearly as possible.
4. Cement base coating is formulated with a very fine aggregate system and is a built-in bonding agent.

G. Paint
1. All paints and materials will conform to all federal specifications or be similar "top-of-the-line-components." Paints will not contain more than .06 percent by weight of lead.
2. Type of paints for toilets.
    a. Inside concrete surfaces.
        i. Interior floors will be a 2-component, catalyzed, water borne polyamide epoxy with a micronized polymer additive to provide uniform slip resistant texture. The color will be gray.
        ii. Interior walls and ceilings will be a modified acrylic, water repellent penetrating stain. The color will be white followed by a clear acrylic anti-graffiti sealer.
    b. Metal surfaces both inside and out.
        i. DTM ALKYD.
    c. Exterior concrete surfaces.
        i. Exterior slab will be clear sealer.
        ii. Exterior walls and roof will be a water repellent penetrating stain in the same color as the walls or roof followed by a clear acrylic anti-graffiti sealer.

H. Grab bars
1. Grab bars will be 18-gauge, type 304 stainless steel with 1½" clearance. Grab bars will each be able to withstand 300-pound top loading.

I. Toilet Paper Dispenser
1. Dispenser will be constructed of ¼" thick, type 304 stainless steel. Dispenser will be capable of holding three (3) standard rolls of toilet paper. Toilet paper holder fastening system will be able to withstand 300-pound top loading.

J. Steel Doors
   1. Doors will be flush panel type 1¾" thick, minimum 16-gauge galvanized steel, top painted with DTM ALKYD.
   2. Door frames will be knockdown or welded type, single rabbet, minimum 16-gauge prime coated steel top painted with DTM ALKYD, width to suit wall thickness. Three (3) rubber door silencers will be provided on latch side of frame.

K. Door Hinges
   1. Door hinges will be three (3) per door with dull chrome plating 4½" x 4½", adjustable tension, automatic closing for each door.

L. Lockset
   1. Lockset will meet ANSI A156.2 Series 4000, Grade 1 cylindrical lockset for exterior door.
   2. Lever handle both inside and out.
   3. Either handle operates latch unless outside handle is locked by inside push-button.
   4. Push-button will automatically release when inside lever handle is turned or door is closed.
   5. Emergency slot on exterior so door can be unlocked from the outside with a coin, screwdriver, etc.
   6. Inside lever always active.
   7. U.S. 26D finish.

M. Dead Bolt
   1. Deadbolt will be a Lori Lock standard model with a double cylinder, 2¾" backset, and US26D finish. The cylinder will be a standard 1⅛" Schlage Mortise cylinder with compression ring and 626 finish.

N. Door Stop
   1. Doorstop will be a dome style stop meeting ANSI 156.16.

O. Double Coat Hook
   1. Coat hook will be 304 stainless steel 16-gauge (1.5mm), formed construction with a satin finish and have $\frac{3}{16}$" x ⅞" nail in anchor. Upper hook will extend at least 2½" from the wall. Lower hook will extend at least 1¼" from the wall.

P. Door Sweep
   1. Door sweep will be provided at the bottom of door and will be an adjustable brush type.

Q. Wall Vent
   1. Wall vent will be cast into the concrete wall. The units' frame will be C3 x 4.1 channel steel. The louver frame and louvers will be 18-gauge zinc coated steel with baked enamel finish. Vent to come with insect screen.

R. Windows and Vault Cleanout Cover
   1. Windows and cleanout cover frames will be constructed from steel.
   2. Window glazing will be $\frac{3}{16}$" thick translucent pebble finished mar-resistant Lexan.
   3. Plate for vault cleanout cover will be ¼" thick diamond plate steel. Lid will be hinged and configured so that it can be locked with a padlock. A gasket will be provided around the entire perimeter of the lid to provide an airtight seal.

S. Polyethylene Vault Liner
   1. Made of a Roto molded 8460 polyethylene.
   2. Holds up to 1,000 gallons of waste or 15,000 uses per vault.
   3. Minimum thickness .100.
   4. Molded dovetail embeds to attach the liner to concrete walls of the vault.
   5. Welded two (2) C-channels to attach the liner to the bottom of the vault.

T. Optional Roof Insulation
   1. Ceiling anchored ½" plywood + fiberglass laminate + 2" polyurethane foam. Approximately R-19.

6.0 MANUFACTURE

A. Mixing and Delivery of Concrete
   1. Mixing and delivery of concrete will be in accordance with ASTM C94, Section 10.6 through 10.9 with the following additions:
      a. Aggregate and water will be adjusted to compensate for differences in the saturated surface-dry condition.

B. Placing and Consolidating Concrete
   1. Concrete will be consolidated by the use of mechanical vibrators. Vibration will be sufficient to accomplish compaction but not to the point that segregation occurs.

C. Finishing Concrete
   1. Interior floor and exterior slabs will be floated and troweled. A light broom finish will be applied to the exterior slabs.
   2. All exterior building walls and exterior screen walls will be any one of the available textures.
   3. All exterior surfaces of the roof panels will be cast to simulate a cedar shake roof. The underside of the overhang will have a smooth finish (optional roof textures available).

D. Cracks and Patching
   1. Cracks in concrete components which are judged to affect the structural integrity of the building will be rejected.
   2. Small holes, depressions and air voids will be patched with a suitable material. The patch will match the finish and texture of the surrounding surface.
   3. Patching will not be allowed on defective areas if the structural integrity of the building is affected.

E. Curing and Hardening Concrete
   1. Concrete surfaces will not be allowed to dry out from exposure to hot, dry weather during initial curing period.

7.0 FINISHING AND FABRICATION

A. Structural Joints
   1. Wall components will be joined together with two (2) welded plate pairs at each joint. Each weld plate will be 6" long and located one (1) pair in the top quarter and one (1) pair in the bottom quarter of the seam. Weld plates will be anchored into the concrete panel and

welded together with a continuous weld. The inside seams will be a paintable caulk. The outside seams will use a caulk in a coordinating building color or clear.

2. Walls and roof will be joined with weld plates, 3" x 6" at each building corner. The joint between the floor slab and walls will be joined with a grout mixture on the inside, a matching colored caulk on the outside and two (2) weld plates 6" long per wall.

B. Painting/Staining
   1. An appropriate curing time will be allowed before paint is applied to concrete.
   2. Some applications may require acid etching. A 30% solution of hydrochloric acid will be used, flushed with water, and allowed to thoroughly air dry.
   3. Painting will not be done outside in cold, frosty, or damp weather.
   4. Painting will not be done outside in winter unless the temperature is 50ºF or higher.
   5. Painting will not be done in dusty areas.
   6. Schedule of finishes.
      a. Inside concrete surfaces.
         i. Inside floors will be one (1) coat of 1-part water-based epoxy with a silica sand suspension to provide uniform texture.
         ii. Interior walls and ceilings will be two (2) coats of a modified acrylic, water repellent penetrating stain, followed by one (1) coat of clear sealer.
      b. Metal surfaces both inside and out.
         i. Two (2) coats of DTM ALKYD.
      c. Exterior concrete surfaces.
         i. Exterior slab will be one (1) coat of clear sealer.
         ii. Exterior walls will be two (2) coats of water repellent penetrating stain in the same color as the walls or roof followed by one (1) coat of clear acrylic anti-graffiti sealer.

8.0 TESTING

The following tests will be performed on concrete used in the manufacture of toilets. All testing will be performed in the CXT (PCI certified) laboratories. Testing will only be performed by qualified individuals who have been certified ACI Technician Grade 1. Sampling will be in accordance with ASTM C172.

A. The air content of the concrete will be checked per ASTM C231 on the first batch of concrete. The air content will be in the range of 5.0% +/- 2.0%.

B. The compressive strength of the cylinders will be tested to ASTM C39. We will make one (1) cylinder for release, one (1) for seven (7) days and one (1) for 28 days. The release must be a minimum strength of 2500 psi, the 7-day must be a minimum of 4500 psi and the 28-day must be a minimum of 4500 psi.

C. A copy of all test reports will be available to the customer as soon as 28-day test results are available.

9.0 INSTALLATION

A. Scope of Work
   1. Work specified under this section includes excavation, backfill and placement of precast concrete vault toilet.

B. Materials
   1. Bedding material to be sand or ⅜″ minus crushed or screened aggregate.
   2. Caulking between vault and toilet floor to be 1″ x 1″ Butyl tape designed specifically to bond precast concrete to precast concrete.

C. Location
   1. It is the responsibility of the customer to:
      a. Provide exact location by stakes or other approved method.
      b. Provide clear and level site free of overhead and/or underground obstructions.
      c. Provide access to the site for truck delivery and sufficient area for the crane to install and the equipment to perform the contract requirements.

D. Access to Site
   1. Delivery to site made on normal highway trucks and trailers. If at the time of delivery conditions of access are hazardous or unsuitable for truck and equipment due to weather, physical constraints, roadway width or grade, CXT may require an alternate site with better access provided to ensure a safe and quality installation.

E. Excavation and Elevation
   1. Comply with all applicable OSHA standards for excavation.
   2. Excavate for the installation of the toilet vault to a depth that will allow the structure site to be free draining after installation is completed. Allow for a 2″ leveling course beneath the toilet vault. Stockpile topsoil in a separate pile at sites.
   3. Finish floor elevation will be 4-6″ above natural grade measured at the front (entrance) of the exterior slab unless otherwise approved by the customer. Ideally, the back of the building should be slightly higher to allow water to freely drain out of the toilet rooms. The customer may specify a finish floor elevation for buildings at some sites. The contractor will install buildings at these sites with the floor elevation within a plus or minus 0.05′ of the specified floor elevation.
   4. No excavation will be left open more than seven (7) days unless otherwise approved by the customer.
   5. All excavations left open overnight will be fenced with wire mesh or plastic mesh fence secured to steel posts all around the excavation.
   6. The bottom of the fence will generally follow the contour of the ground.
   7. Maximum spacing of the steel posts will be 10′.
   8. Minimum height of the fence will be 36″.

F. Backfill and Compaction
   1. Compact the natural ground at the bottom of the vault excavation with a minimum of three (3) passes with a whacker-type mechanical compactor or equivalent approved by the customer.
   2. Install sand or aggregate bedding material for leveling course if needed. Compact leveling course with one (1) pass with a whacker-type mechanical tamper or equivalent approved by the customer.

3. No high spots in the middle of the vault bottom. Compact with a second pass with a whacker or approved equivalent tamper.
4. Set vault in place and check for level or appropriate scope. Backfill around structure. Use excavated material for backfill except those rocks larger than 6" in maximum dimension shall not be placed within 6" of the exterior vault walls.
5. Fill, adjacent to the building entry, will have excavated material placed in 8" loose lifts and compacted with a minimum of two (2) passes with a whacker- type mechanical compactor of equivalent approved by the customer.

G. Finish Grading
1. Spread excess excavated material from the vault around structure. Intended final grade is flush with the top of the front slab. Allow for placement of topsoil to reach that grade. Grade backfill away from structure at maximum slope of 5% unless otherwise approved by the customer.
2. Spread stockpiled topsoil as final layer after rough grading is completed. Areas disturbed by excavation, backfilling and stockpiling of excavated materials will be hand raked to remove exposed rocks over 1" in maximum dimension. Oversized rocks removed from the surface shall be disposed of in a designated area within 200' of the site.

H. Vault Toilet Riser and Accessories
1. Polyurethane caulk will be applied between toilet riser flange and concrete floor before the toilet riser is installed.

I. Exhaust Pipe Installation
1. After exhaust pipe is installed, seal around pipe at top and underside of roof with polyurethane caulk. Seal around pipe at top of slab will be accomplished by using polyurethane caulk.

10.0 WARRANTY—PRECAST DIVISION

CXT provides a one (1) year warranty. CXT warrants that all goods sold pursuant hereto will, when delivered, conform to specifications set forth above. Goods shall be deemed accepted and meeting specifications unless notice identifying the nature of any non-conformity is provided to CXT in writing within the specified warranty. CXT, at its option, will repair or replace the goods or issue credit for the customer provided CXT is first given the opportunity to inspect such goods. It is specifically understood that CXT's obligation hereunder is for credit, repair, or replacement only, F.O.B. CXT's manufacturing plants, and does not include shipping, handling, installation or other incidental or consequential costs unless otherwise agreed to in writing by CXT.

This warranty shall not apply to:

1. Any goods which have been repaired or altered without CXT's express written consent, in such a way as in the reasonable judgement of CXT, to adversely affect the stability or reliability thereof;
2. To any goods which have been subject to misuse, negligence, acts of God or accidents; or
3. To any goods which have not been installed to manufacturer's specifications and guidelines, improperly maintained, or used outside of the specifications for which such goods were designed.

11.0 DISCLAIMER OF OTHER WARRANTIES

The warranty set forth above is in lieu of all other warranties, express or implied. All other warranties are hereby disclaimed. CXT makes no other warranty, express or implied, including, without limitation, no warranty of merchantability of fitness for a particular purpose or use.

12.0 LIMITATION OF REMEDIES

In the event of any breach of any obligation hereunder, breach of any warranty regarding the goods or any negligent act or omission or any party, the parties shall otherwise have all rights and remedies available at law; however, IN NO EVENT SHALL CXT BE SUBJECT TO OR LIABLE FOR ANY INCIDENTAL OR CONSEQUENTIAL DAMAGES.