

**HAWAIIAN TELCOM GENERAL  
CONSTRUCTION/DESIGN NOTES**

1. The Contractor shall procure and pay for all licenses and permits and shall give all notices necessary and incident to the due and lawful prosecution of the work.
2. The Contractor shall obtain an excavation permit and toning request from Hawaiian Telcom's Excavation Permit Section, located at 1177 Bishop Street, two weeks prior to the start of construction. Hours of business are 8:00 a.m. to 11:00 a.m. and 12:00 p.m. to 3:00 p.m. Monday through Friday, except holidays.
3. Prior to the excavation of the ductline, the contractor shall request Hawaiian Telcom to locate existing ductline wherever required. For underground cable locating and marking, five (5) working days advance notice is required. Three (3) working days advance notice is required for any inspection by a designated representative.
4. The locations of existing utilities are approximate only. The Contractor shall exercise extreme caution and shall maintain proper clearances whenever construction crosses or is in close proximity of Hawaiian Telcom facilities. The Contractor shall verify their locations and shall be liable for any damages to Hawaiian Telcom facilities. Any damages shall be reported immediately to Hawaiian Telcom's repair section at #611 (24 hours) or to the excavation permit section at 546-7746 (normal working hours, Monday through Friday, except holidays). As a result of his operations, adjustments to the new ductline alignment, if required, shall be made to provide the required clearances.
5. The Contractor shall take necessary precaution not to damage existing cables or ducts. A Hawaiian Telcom inspector or designated representative is required to be at any job site whenever there will be a breakage into or entry into any structure that contain Hawaiian Telcom facilities. Temporary cable and duct supports shall be provided wherever necessary.
6. The Contractor shall notify Hawaiian Telcom's inspector or designated representative a minimum of 72 hours prior to excavation, bracing, or backfilling of Hawaiian Telcom's structures or facilities.
7. All applicable construction work shall be done in accordance with the "Hawaiian Telcom Standard Specifications for Placing Telephone Systems" dated January 2007. All subsequent amendments and additions, and all other pertinent standards for telephone construction. Contractor shall familiarize his personnel by obtaining applicable specifications.
8. When excavation is adjacent to or beneath Hawaiian Telcom's existing structures or facilities, the contractor shall:
  - a) Sheet and/or brace the excavation to prevent slides, cave-ins, or settlements to ensure no movement to Hawaiian Telcom's structures or facilities.
  - b) Protect existing structures and/or facilities with beams, struts, or underpinning while excavating beneath them to ensure no movement to Hawaiian Telcom's structures or facilities.
9. The Contractor shall brace all poles or light standards near the new ductline, manhole, or handhole during his operations.
10. The Contractor shall saw-cut A.C. pavement and concrete gutter wherever new manholes, handholes, or ductlines are to be placed and shall restore to existing condition or better.
11. The Contractor shall comply with the policy adopted by the Department of Public Works, City and County of Honolulu, concerning the replacement of concrete sidewalks after excavation work.

12. The underground pipes, cables, or ductlines known to exist by the engineer from his search of records are indicated on the plans. The Contractor shall verify the locations and depths of the facilities and exercise proper care in excavating in the area. Wherever connections of new utilities to existing utilities are shown on the plans, the Contractor shall expose the existing lines at the proposed connections to verify their locations and depths prior to excavation for the new lines.
13. Wherever connections to existing utilities are shown on the plans, the contractor shall expose the existing lines prior to excavation of the main trenches to verify their locations and depths.
14. The Contractor, at his own expense, shall keep the project and surrounding area free from dust nuisance. The cost for supplementary measures, which will be required by the City and County, shall be borne by the Contractor.
15. The Contractor shall pump all manholes dry during final inspection.
16. The Contractor shall notify Hawaiian Telcom inspector 24 hours prior to the pouring of concrete or backfilling.
17. When connecting to manhole walls, all existing reinforcing bars shall be left intact. Ducts shall be adjusted in the field in order to clear reinforcing
18. The Contractor shall be responsible for laying out all required lines and grades and shall preserve all bench marks and working points necessary to lay out the work correctly. The new ductline shall be adjusted by the Contractor to suit the existing conditions and the details as described in the plans.
19. Minimum concrete strength shall be:
 

For ductline	2500 psi at 28 days
For manhole	3000 psi at 28 days or as specified in design notes
20. Bends in the duct alignment, due to changes in grade shall have a minimum radius of 25 feet. All 90 degree C-bends at a pole or at the building floor slab penetration, shall have a bend radius of ten times the diameter of the duct or greater.
21. After ductline has been completed, a mandrel with a square front not less than 12" long and having a diameter of 1/4" less than the inside diameter of the duct, shall be pulled through each duct after which a brush with stiff bristles shall be pulled through to make certain that no particles of earth, sand, or gravel have been left inside. Ducts shall be completely dry and clean.
22. All ducts and conduits shall have an 1800# polyester mule-tape (NEPTCO, WP1800P, Hawaiian Telcom Material Code No. 571154) installed throughout its entire length. All ducts shall be capped to prevent entry of foreign material during construction and at the completion of installation.

**HAWAIIAN TELCOM GENERAL CONSTRUCTION**  
**NOTES WITHIN A BUILDING**

1. Metallic entrance conduits shall be grounded.
2. All conduits within a building shall:
  - a) Be installed in the shortest and straightest possible run.
  - b) Have no section longer than 100 feet nor contain more than two 90-degree bends. An approved sized junction box or gutter box shall be placed if this is exceeded.
  - c) Have long sweep radius bends but the inside radius of the bend MUST never be less than ten times the diameter of the conduit.
3. Ducts and/or conduits installed for usage by Hawaiian Telcom shall be inspected by Hawaiian Telcom.
4. All construction must be inspected and approved by Hawaiian Telcom prior to the installation of any of its facilities and the energizing of its systems.
5. Contractor and/or customer shall provide Hawaiian Telcom with sufficient installation time in their occupancy timetable.
6. Contractor shall provide all materials and furnish all labor and equipment necessary.
7. The Contractor shall provide a 5/8" x 8' galvanized ground rod below the telephone cabinet or backboard and a #6TW insulated green ground wire with a 3' coil. Telephone cabinets shall be grounded and equipped with 3/4" treated backboard. Non-enclosed backboards will only be acceptable in situations complying with the current National Electrical Code (NEC).
8. Inside Wiring (IW) Conduit Size -- depends on customer's service needs:

Type Of Service	IW Cable Size	Conduit Capacity for Telco Requirements						
		EMT Conduit Capacity					Max Length	Max 90° Bends
		1/2"	3/4"	1"	1 1/4"	1 1/2"		
Residential Apartments	2-4 pair	3	6	10	13	24	100'	2
Multi-Line Application	25 pair	0	1	1	2	4	150'	2
	50 pair	0	0	1	1	1	150'	2
	100 pair	0	0	0	1	1	150'	2
EMT Bend Radii	-----	6	8	12	14	18	-----	-----

9. Minimum Size Telco Cabinets:

Telephone Service Only:

Junction Boxes: 16X cable diameter but not less than 4" X 4".

Entrance Cabinets:

0-50 pair cable 18" X 24" X 6"

50-100 pair cable 24" X 36" X 6"

100-400 pair cable 36" X 48" X 6"

Note: Entrance Telco Cabinet must conform to NEMA3 specification with hinged door and locking latch.

10. Residential telephone cabling shall conform to TIA 570-A, Grade 1 standards consisting of one category 3 cable having a minimum of 3 pairs, 24 gauge, unshielded insulated twisted copper wires with pair color coding of blue-white, orange-white, green-white or red-green, yellow-black and blue-white, respectively. All inside wiring (IW) shall be tagged (identified) at each serving terminal or NID (network interface device).
11. Galvanized eyebolts shall not be less than 5/8" in diameter.

**HAWAIIAN TELCOM UNDERGROUND CONSTRUCTION STANDARDS FOR  
RESIDENTIAL PROPERTY**

- A. SERVICE CONNECTION: 320' free allowance for aerial and 500' for U.G.
- B. RESIDENTIAL UNDERGROUND CONDUIT REQUIREMENTS:
1. Recommend 18" but not less than 12" on private property, 24" minimum on City & County right of way, and 36" minimum on State Highways.
  2. Trench shall have a flat surface and shall be deep enough to obtain minimum cover.
    - a. First 6 inches of backfill must be soft earth or sand and free of rocks. Fill must be able to pass through a 1/2" screen.
  3. Conduit runs of 150' and multiples thereof shall have intermediate pullbox. If impractical to place a pullbox and conduit runs are 1.5 (225') to 2.5 (375') times greater than 150', use the next larger size conduit.
  4. Manufactured 90 degree duct bends may be used only for service pole, equipment risers, or building entry, unless specifically indicated as acceptable. The minimum manufactured bend radius shall be 24 inches for ducts less than 3 inch diameter, and 36 inches for 3 inches or greater diameter. Otherwise, long sweep bends having a minimum radius of 25 feet shall be used for a change of direction of more than 5 degrees, either horizontally or vertically. Both curved and straight sections may be used to form long sweep bends as required, but maximum curve shall be 30 degrees.
  5. Service entrance shall be located outside and must be accessible at all time. Entry location must conform to current NEC code requirements. Conduit at house shall rise no more than 5' and not less than 2' above grade.
  6. Conduit riser on service pole shall terminate at least 6" above grade with riser ends capped with weather head or plugged with duct seal.
    - a. When telephone and electric service conduits terminate on the same service pole, preferably, the two conduits should be placed opposite each other on the service pole. However, it is permissible to place conduits with less separation but not less than 1/4 of the circumference of the pole (climbing space must be maintained).
    - b. Riser conduit shall be properly strapped.
    - c. Muletape or approved equivalent shall be installed in all conduits.
  7. Conduit size - depends on customer's service needs:

Telephone Service Only

- 1-1/2" - 1-4 Drops
- 2" - Multi drop cable
- 4" - Cable

Notes:

1. Customer retains ownership of conduit system on private property and is responsible for cost of maintenance and/or repairs.
2. HTC retains ownership of drop up to protector and is responsible for the cost of maintenance and/or repairs.
3. Customer to insure conduit and pullboxes are free from obstruction prior to installation of service drop(s).
8. For service drop only, install 436T Water Meter Pullbox(es) (20-1/4" x 12-3/8" x 12-0"), with metal cover or approved equal.
9. Clearance from power - 3" when encased in concrete; 4" when separated with brick or mason; 12" of well tamped earth. Six inches when crossing foreign objects, i.e., power, water or sewer pipe, etc.
10. Minimum Protection Requirements for facilities subjected to vehicular traffic:

<u>Size</u>	<u>Type</u>	<u>Method of Construction</u>
2"	PVC Schedule 40	Direct Buried
4"	GTS-8342 "DB"	Concrete Encased

11. Strongly recommend that trees with aggressive root systems are not planted near conduit system.

C. LIMITING LENGTHS OF LATERAL OR SUBSIDIARY DUCTS:

<u>Cable Diameter(Inches)</u>	<u>Limiting Lengths of Subsidiary Ducts (Feet)</u>			<u>Minimum Diameter of Duct (Inches)</u>
	<u>No 90° Bend</u>	<u>1-90° Bend</u>	<u>2-90° Bend</u>	
Less than 1"	750	500	200	2.0
1.00 to 1.20	750	500	300	4.0
1.21 to 1.40	600	400	275	4.0
1.41 to 1.60	525	350	250	4.0
1.61 to 1.80	450	300	200	4.0
1.81 to 2.15	375	250	150	4.0
2.16 to 2.61	300	200	100	4.0
2.62 to 2.96	300	200	---	4.0