



## Fugro EarthData's Accuracy Assessment Form ( QC Master)

Project Name/Number: E10-0041-00\_CACoastalMapping\_10MContour\_Ortho

Date: Feb 15-April 18 2011

<b>Coordinate System:</b>	<b>Horizontal Datum:</b>	<b>UTM Zone or SPC State name:</b>	<b>QC Points Source:</b>	<b>For Elevation purposes use ONLY:</b>		
UTM	NAD83/NSRS2007	UTM zone 10	Field GCP	RMSE	Enter Value in GSD	(Meter)
<b>Units:</b>	<b>Product type:</b>	<b>GSD:</b>	<b>Vertical Datum:</b>	<b>Vertical Accuracy Value</b>	Supported Height RMSE According to Map Scale=	(Meter)
(Meter)	Ortho	0.3 m	Ellipsoidal Height (WGS84)	Use Map Scale	<b>0.50</b>	

Block ID:		Ortho/stereo/DEM measured by EarthData			QA/QC Points as surveyed In the Field		
		UTM zone 10	NAD83/NSRS2007	Ellipsoidal Height (WGS84)	UTM zone 10	NAD83/NSRS2007	Ellipsoidal Height (WGS84)
Point ID	Block/Model/ Sheet ID	Easting (E) (Meter)	Northing (N) (Meter)	Elevation (H) (Meter)	Easting (E) (Meter)	Northing (N) (Meter)	Elevation (H) (Meter)
P021	North	406373.836	4543572.121		406373.853	4543572.051	0.000
204	North	407731.059	4555651.964		407731.340	4555652.130	0.000
203	North	412295.312	4572781.048		412295.570	4572781.215	0.000
202	North	417262.446	4596827.801		417262.678	4596827.884	0.000
P011 NEW	North	404469.643	4620132.338		404469.734	4620132.389	0.000
201	North	405740.540	4640358.425		405740.798	4640358.554	0.000
P002	North	399758.865	4650441.170		399758.696	4650441.278	0.000
P005 NEW	North	400699.008	4640100.148		400698.955	4640100.255	0.000
P004 NEW	North	401567.334	4640269.582		401567.272	4640269.551	0.000
P051	North	436051.040	4311785.614		436051.040	4311785.690	0.000
209	North	435538.512	4338950.055		435538.310	4338949.979	0.000
210	North	444208.649	4335381.535		444208.408	4335381.483	0.000
238	North	438194.107	4378434.429		438193.655	4378434.601	0.000
P040	North	432187.992	4392604.543		432187.952	4392604.723	0.000
P037	North	427334.043	4409479.797		427333.951	4409479.820	0.000
P032	North	405869.732	4440530.336		405869.828	4440530.541	0.000
P030	North	385407.591	4460827.156		385407.749	4460827.360	0.000
P031	North	384241.063	4457542.194		384241.090	4457542.433	0.000
206	North	394989.026	4492040.396		394988.911	4492040.460	0.000
207	North	402472.520	4484470.787		402472.585	4484470.967	0.000
208	North	392798.796	4451123.029		392798.637	4451123.590	0.000
205	North	409555.378	4513749.140		409555.235	4513749.267	0.000
230	North	558697.676	4158841.247		558697.734	4158841.477	0.000
231	North	589710.884	4140906.197		589711.419	4140906.615	0.000
229	North	581497.044	4166732.284		581496.854	4166732.407	0.000
228	North	561828.744	4188842.496		561828.703	4188842.558	0.000
227	North	551700.421	4199818.146		551700.421	4199818.245	0.000
226	North	558813.428	4205921.867		558813.355	4205921.976	0.000
225	North	583241.072	4206655.390		583240.751	4206655.361	0.000
224	North	601663.391	4207695.102		601663.234	4207695.133	0.000
222	North	576146.719	4231173.102		576146.546	4231173.102	0.000
219	North	563462.212	4230864.259		563461.788	4230864.224	0.000
220	North	562710.133	4244050.159		562710.018	4244050.101	0.000
218	North	548870.987	4234150.314		548870.939	4234150.426	0.000
216	North	538524.869	4217524.024		538525.103	4217523.489	0.000
217	North	532750.615	4232074.096		532750.364	4232074.119	0.000
211	North	510650.439	4260927.173		510650.224	4260927.162	0.000
213	North	506967.188	4241108.363		506966.961	4241108.339	0.000
214	North	517264.047	4213763.848		517263.989	4213763.984	0.000
P061NEW	North	505462.622	4223719.837		505462.818	4223720.077	0.000
P064NEW	North	499261.662	4205493.013		499261.933	4205493.047	0.000
215	North	526619.224	4195939.270		526619.055	4195939.503	0.000
P054NEW	North	462788.489	4283675.444		462788.357	4283675.585	0.000
P053NEW	North	461676.005	4283920.815		461676.108	4283920.910	0.000

Block ID:		Ortho/stereo/DEM measured by EarthData			QA/QC Points as surveyed In the Field		
Point ID	Block/Model/ Sheet ID	UTM zone 10 NAD83/NSRS2007			UTM zone 10 NAD83/NSRS2007		
		Easting (E) (Meter)	Northing (N) (Meter)	Elevation (H) (Meter)	Easting (E) (Meter)	Northing (N) (Meter)	Elevation (H) (Meter)
P054NEW	North	462788.489	4283675.444		462788.357	4283675.585	0.000
232	Central	555683.833	4123286.490		555683.862	4123286.720	0.000
233	Central	613265.637	4086456.348		613265.496	4086456.599	0.000
234	Central	618101.239	4059555.157		618100.950	4059555.597	0.000
235	Central	699601.653	3911390.837		699601.568	3911390.943	0.000
236	Central	719675.826	3880936.350		719675.538	3880936.597	0.000
237	Central	725698.626	3840003.149		725698.414	3840003.186	0.000
239	Central	692199.156	3903710.245		692199.117	3903710.493	0.000
249	Central	618295.160	4003574.546		618295.020	4003574.927	0.000
P084	Central	595429.347	4054533.777		595429.510	4054533.988	0.000
P124	Central	729355.882	3821664.355		729355.602	3821664.457	0.000
P068	Central	542631.392	4154568.557		542631.197	4154568.526	0.000
P069	Central	545574.111	4151567.538		545573.991	4151567.754	0.000
P070	Central	547064.108	4150429.662		547063.915	4150429.721	0.000
P070R	Central	547256.137	4150439.857		547256.401	4150439.893	0.000
P071	Central	553337.984	4134845.243		553337.912	4134845.272	0.000
P072	Central	554355.134	4131302.845		554355.004	4131303.261	0.000
P077R	Central	579493.352	4091407.316		579493.046	4091407.805	0.000
P078	Central	581087.168	4091006.277		581087.064	4091006.715	0.000
P079	Central	599933.670	4091005.737		599933.381	4091006.078	0.000
P080	Central	600524.329	4089450.122		600524.099	4089450.447	0.000
P081	Central	608276.507	4075243.069		608276.486	4075243.215	0.000
P081R	Central	608284.702	4075281.348		608284.668	4075281.583	0.000
P082	Central	608279.415	4073267.812		608279.036	4073268.045	0.000
P085	Central	596716.968	4053400.013		596717.117	4053400.227	0.000
P087	Central	601458.815	4051352.647		601458.915	4051352.862	0.000
P088	Central	599359.706	4050841.395		599359.775	4050841.626	0.000
P090	Central	596487.146	4045783.062		596486.967	4045783.185	0.000
P094	Central	635580.990	3983813.020		635581.079	3983813.214	0.000
P095	Central	637346.185	3979147.263		637345.974	3979147.527	0.000
P096	Central	638165.501	3977542.232		638165.364	3977542.369	0.000
P097	Central	638881.016	3973167.075		638880.737	3973167.474	0.000
P099	Central	650903.265	3960885.135		650902.855	3960885.340	0.000
P100	Central	651824.707	3959169.331		651824.419	3959169.223	0.000
P100R	Central	651922.333	3959116.327		651922.360	3959116.569	0.000
P101	Central	655839.022	3948745.366		655838.794	3948745.366	0.000
P102	Central	655305.122	3948238.317		655304.870	3948238.267	0.000
P103	Central	664128.369	3945948.277		664128.267	3945948.216	0.000
P104	Central	667884.629	3942832.114		667884.591	3942832.339	0.000
P107	Central	691509.780	3924175.609		691509.541	3924175.657	0.000
P108	Central	692385.081	3922591.985		692384.960	3922592.312	0.000
P109	Central	694525.544	3916388.675		694525.329	3916388.718	0.000
P110	Central	695247.868	3914964.402		695247.804	3914964.456	0.000
P111	Central	694846.223	3910079.399		694846.205	3910079.523	0.000
P112	Central	704357.542	3894568.935		704357.269	3894568.928	0.000
P113	Central	715091.510	3891738.292		715091.297	3891738.207	0.000
P114	Central	716487.148	3888167.502		716487.210	3888167.358	0.000
P118	Central	716856.706	3848697.855		716856.632	3848697.855	0.000
P120	Central	719855.560	3841374.035		719855.387	3841374.208	0.000
P122	Central	717006.648	3828330.755		717006.228	3828330.978	0.000
P123	Central	719306.824	3826280.283		719306.773	3826280.258	0.000
P125	Central	748694.554	3817783.571		748694.430	3817783.643	0.000
P127	Central	733130.841	3816031.055		733130.565	3816031.216	0.000
P132	Central	762670.652	3818508.841		762670.652	3818509.191	0.000
126	Central	775368.166	3817361.236		775367.899	3817361.097	0.000

Block ID:		Residual error = Measured coordinates -- surveyed coordinates			Normalized error = Residuals - bias			Comments
Point ID	Block/Model/ Sheet ID	ΔE (Easting) (Meter)	ΔN (Northing) (Meter)	ΔH (Elevation) (Meter)	ΔE (Easting) (Meter)	ΔN (Northing) (Meter)	ΔH (Elevation) (Meter)	
P021	North	-0.017	0.070	No Data	-0.107	0.198	No Data	
204	North	-0.281	-0.166	No Data	-0.370	-0.037	No Data	
203	North	-0.258	-0.167	No Data	-0.347	-0.038	No Data	
202	North	-0.232	-0.083	No Data	-0.321	0.046	No Data	
P011 NEW	North	-0.091	-0.051	No Data	-0.180	0.078	No Data	
201	North	-0.258	-0.129	No Data	-0.347	-0.001	No Data	
P002	North	0.169	-0.108	No Data	0.080	0.020	No Data	
P005 NEW	North	0.053	-0.107	No Data	-0.036	0.022	No Data	
P004 NEW	North	0.062	0.031	No Data	-0.027	0.160	No Data	
P051	North	0.000	-0.076	No Data	-0.089	0.052	No Data	
209	North	0.202	0.076	No Data	0.113	0.205	No Data	
210	North	0.241	0.052	No Data	0.152	0.180	No Data	
238	North	0.452	-0.172	No Data	0.363	-0.043	No Data	
P040	North	0.040	-0.180	No Data	-0.049	-0.051	No Data	
P037	North	0.092	-0.023	No Data	0.003	0.106	No Data	
P032	North	-0.096	-0.205	No Data	-0.185	-0.077	No Data	
P030	North	-0.158	-0.204	No Data	-0.247	-0.075	No Data	
P031	North	-0.027	-0.239	No Data	-0.116	-0.110	No Data	
206	North	0.115	-0.064	No Data	0.026	0.065	No Data	
207	North	-0.065	-0.180	No Data	-0.154	-0.051	No Data	
208	North	0.159	-0.561	No Data	0.070	-0.433	No Data	
205	North	0.143	-0.127	No Data	0.054	0.002	No Data	
230	North	-0.058	-0.230	No Data	-0.147	-0.102	No Data	
231	North	-0.535	-0.418	No Data	-0.624	-0.290	No Data	
229	North	0.190	-0.123	No Data	0.101	0.006	No Data	
228	North	0.041	-0.062	No Data	-0.048	0.067	No Data	
227	North	0.000	-0.099	No Data	-0.089	0.030	No Data	
226	North	0.073	-0.109	No Data	-0.016	0.019	No Data	
225	North	0.321	0.029	No Data	0.231	0.158	No Data	
224	North	0.157	-0.031	No Data	0.068	0.097	No Data	
222	North	0.173	0.000	No Data	0.084	0.129	No Data	
219	North	0.424	0.035	No Data	0.335	0.164	No Data	
220	North	0.115	0.058	No Data	0.026	0.186	No Data	
218	North	0.048	-0.112	No Data	-0.041	0.017	No Data	
216	North	-0.234	0.535	No Data	-0.323	0.663	No Data	
217	North	0.251	-0.023	No Data	0.162	0.106	No Data	
211	North	0.215	0.011	No Data	0.126	0.140	No Data	
213	North	0.227	0.024	No Data	0.138	0.153	No Data	
214	North	0.058	-0.136	No Data	-0.032	-0.008	No Data	
P061NEW	North	-0.196	-0.240	No Data	-0.285	-0.111	No Data	
P064NEW	North	-0.271	-0.034	No Data	-0.360	0.095	No Data	
215	North	0.169	-0.233	No Data	0.080	-0.104	No Data	
P054NEW	North	0.132	-0.141	No Data	0.043	-0.012	No Data	
P053NEW	North	-0.103	-0.095	No Data	-0.192	0.034	No Data	

Block ID:		Residual error = Measured coordinates -- surveyed coordinates			Normalized error = Residuals - bias			Comments
Point ID	Block/Model/ Sheet ID	ΔE (Easting) (Meter)	ΔN (Northing) (Meter)	ΔH (Elevation) (Meter)	ΔE (Easting) (Meter)	ΔN (Northing) (Meter)	ΔH (Elevation) (Meter)	
P054NEW	North	0.132	-0.141	No Data	0.043	-0.012	No Data	
232	Central	-0.029	-0.230	No Data	-0.118	-0.102	No Data	
233	Central	0.141	-0.251	No Data	0.052	-0.122	No Data	
234	Central	0.289	-0.440	No Data	0.200	-0.312	No Data	
235	Central	0.085	-0.106	No Data	-0.004	0.023	No Data	
236	Central	0.288	-0.247	No Data	0.198	-0.118	No Data	
237	Central	0.212	-0.037	No Data	0.123	0.092	No Data	
239	Central	0.039	-0.248	No Data	-0.050	-0.119	No Data	
249	Central	0.140	-0.381	No Data	0.051	-0.253	No Data	
P084	Central	-0.163	-0.211	No Data	-0.252	-0.083	No Data	
P124	Central	0.280	-0.102	No Data	0.191	0.027	No Data	
P068	Central	0.195	0.031	No Data	0.106	0.160	No Data	
P069	Central	0.120	-0.216	No Data	0.031	-0.087	No Data	
P070	Central	0.193	-0.059	No Data	0.104	0.069	No Data	
P070R	Central	-0.264	-0.036	No Data	-0.353	0.092	No Data	
P071	Central	0.072	-0.029	No Data	-0.017	0.100	No Data	
P072	Central	0.130	-0.416	No Data	0.041	-0.287	No Data	
P077R	Central	0.306	-0.489	No Data	0.217	-0.361	No Data	
P078	Central	0.104	-0.438	No Data	0.015	-0.309	No Data	
P079	Central	0.289	-0.341	No Data	0.200	-0.213	No Data	
P080	Central	0.230	-0.325	No Data	0.141	-0.196	No Data	
P081	Central	0.021	-0.146	No Data	-0.068	-0.017	No Data	
P081R	Central	0.034	-0.235	No Data	-0.056	-0.106	No Data	
P082	Central	0.379	-0.233	No Data	0.290	-0.105	No Data	
P085	Central	-0.149	-0.214	No Data	-0.238	-0.085	No Data	
P087	Central	-0.100	-0.215	No Data	-0.190	-0.087	No Data	
P088	Central	-0.069	-0.231	No Data	-0.158	-0.102	No Data	
P090	Central	0.179	-0.123	No Data	0.090	0.005	No Data	
P094	Central	-0.089	-0.194	No Data	-0.179	-0.065	No Data	
P095	Central	0.211	-0.264	No Data	0.122	-0.136	No Data	
P096	Central	0.137	-0.137	No Data	0.048	-0.008	No Data	
P097	Central	0.279	-0.399	No Data	0.190	-0.270	No Data	
P099	Central	0.410	-0.205	No Data	0.321	-0.076	No Data	
P100	Central	0.288	0.108	No Data	0.199	0.237	No Data	
P100R	Central	-0.027	-0.242	No Data	-0.116	-0.114	No Data	
P101	Central	0.228	0.000	No Data	0.139	0.129	No Data	
P102	Central	0.252	0.050	No Data	0.163	0.179	No Data	
P103	Central	0.102	0.061	No Data	0.013	0.190	No Data	
P104	Central	0.038	-0.225	No Data	-0.052	-0.097	No Data	
P107	Central	0.239	-0.048	No Data	0.150	0.081	No Data	
P108	Central	0.121	-0.327	No Data	0.032	-0.198	No Data	
P109	Central	0.215	-0.043	No Data	0.126	0.086	No Data	
P110	Central	0.064	-0.054	No Data	-0.025	0.075	No Data	
P111	Central	0.018	-0.124	No Data	-0.071	0.005	No Data	
P112	Central	0.273	0.007	No Data	0.184	0.136	No Data	
P113	Central	0.213	0.085	No Data	0.124	0.214	No Data	
P114	Central	-0.062	0.144	No Data	-0.151	0.273	No Data	
P118	Central	0.074	0.000	No Data	-0.015	0.129	No Data	
P120	Central	0.173	-0.173	No Data	0.084	-0.044	No Data	
P122	Central	0.420	-0.223	No Data	0.331	-0.094	No Data	
P123	Central	0.051	0.025	No Data	-0.038	0.154	No Data	
P125	Central	0.124	-0.072	No Data	0.034	0.057	No Data	
P127	Central	0.276	-0.161	No Data	0.186	-0.032	No Data	
P132	Central	0.000	-0.350	No Data	-0.089	-0.221	No Data	
126	Central	0.267	0.139	No Data	0.178	0.268	No Data	

Number of check points:	99	99	0	99	99	0
Mean (Bias)	0.09	-0.13	No Data	0.00	0.00	No Data
StDEV	0.18	0.16	No Data	0.18	0.16	No Data
RMSE	0.20	0.20	No Data	0.18	0.16	No Data
Units: (Meter)						

<<<<< Normalized RMSE after bias removal

**Bias Treatment Summary**

To remove the vertical bias's effect from the elevation,	No Data	the vector/DEM data by	No Data	(Meter)
To remove the horizontal bias's effect from planemetric E,	Subtract from	the vector EASTING the value	0.089	(Meter)
To remove the horizontal bias's effect from planemetric N,	Add to	the vector NORTHING the value	0.129	(Meter)

**LEGENDS:**

Orange Point ID ---->  $\Delta > 2 \times \text{RMSE}$

RED  $\Delta E, \Delta N, \Delta H$  ---->  $\Delta > 95\%$  of NSSDA

**Accuracy Computations (before bias removal):**

**GSD = 0.3 m**

(Meter)

**Supported Mapping Scale: 1" = 200' / 1:2,400**

**Supported Height RMSE according to map scale = 1.50**

**ASPRS**

Horizontal RMSE (E) =	0.20	Passed :))	Max. Allowable RMSE in N =	0.60	(Meter)
Horizontal RMSE (N) =	0.20	Passed :))	Max. Allowable RMSE in E =	0.60	(Meter)
Circular RMSE <sub>r</sub> =	0.29	Passed :))	Max. Allowable circular RMSE =	0.85	(Meter)
Vertical RMSE <sub>h</sub> =	No Data		Max. Allowable RMSE in Height =	0.50	(Meter)

**NSSDA**

Horizontal tested at 95% = (1.73xRMSE <sub>r</sub> )	0.49	Passed :))	Max. Allowable Horizontal Error at 95% =	1.47	(Meter)
Vertical tested at 95% = (1.96*RMSE <sub>h</sub> )	No Data		Max. Allowable Vertical Error at 95% =	0.98	(Meter)

**National Maps Accuracy (NMAS)**

Horizontal Accuracy at 90% =	0.43	Passed :))	Max. Allowable Horizontal Error at 90% =	2.03	(Meter)
Vertical Accuracy at 90% =	No Data		Max. Allowable Vertical Error at 90% =	0.75	(Meter)

**Normalized Accuracy Computations (after bias removal):**

**ASPRS**

Horizontal RMSE (E) =	0.18	Passed :))	Max. Allowable RMSE in N & E =	0.60	(Meter)
Horizontal RMSE (N) =	0.16	Passed :))		0.60	(Meter)
Circular RMSE <sub>r</sub> =	0.24	Passed :))	Max. Allowable circular RMSE =	0.85	(Meter)
Vertical RMSE <sub>h</sub> =	No Data		Max. Allowable RMSE in Height =	0.50	(Meter)

**NSSDA**

Horizontal tested at 95% = (1.73xRMSE <sub>r</sub> )	0.41	Passed :))	Max. Allowable Horizontal Error at 95% =	1.47	(Meter)
Vertical tested at 95% = (1.96*RMSE <sub>h</sub> )	No Data		Max. Allowable Vertical Error at 95% =	0.98	(Meter)

**National Maps Accuracy (NMAS)**

Horizontal Accuracy at 90% =	0.36	Passed :))	Max. Allowable Horizontal Error at 90% =	2.03	(Meter)
Vertical Accuracy at 90% =	No Data		Max. Allowable Vertical Error at 90% =	0.75	(Meter)

**Final Assessment and Justification:**

Approved by:

Date: