

ORTHO & PLANIMETRIC UPDATE

REQUEST FROM ASSESSING & ENGINEERING DEPARTMENTS

STAFF REPORT

November 17, 2021

PURPOSE: To expend funds from the Tax Map Updating Fees account for the purposes of updating Hudson's Ortho (aerial imagery) and Planimetric data in the year 2022. The last Ortho update was performed in Spring of 2020, which was also partially funded by this account. The Planimetric data was last updated in 2017. Planimetrics consist of GIS shapefiles of structures, roads and other features. Both are critical tools for town staff in performing their duties in the Assessing, Engineering, Planning and Zoning Departments.

ATTACHMENTS:

- A. Letter from Town Engineer & Chief Assessor to Town Planner & Planning Board, dated October 19, 2021.
- B. Scope of Services from Quantum Spatial, dated October 10, 2021.

COMMENTS:

The last Ortho update was performed in Spring of 2020, which was also partially funded by this account. The Planimetric data was last updated in 2017. Planimetrics consist of GIS shapefiles of structures, roads and other features. Both are critical tools for town staff in performing their duties in the Assessing, Engineering, Planning and Zoning Departments.

As in the past, this is proposed to be partially funded by the Tax Map Updating Fee, a fee collected in Site Plan and Subdivision Applications. The current balance of this account is \$19,611.50. The remaining cost, \$17,000, is to be funded by the Engineering Department.

DRAFT MOTIONS

APPROVE funding of the project with tax map updating fees:

I move to recommend to the Board of Selectmen the release of \$17,000.00 from the Tax Map Updating Fee Account, 01-0000-1312-000-505, for the Ortho & Planimetric Update project in accordance with the request made by the Conservation Commission.

Motion by: _____ Second: _____ Carried/Failed: _____



TOWN OF HUDSON

Engineering Department



12 School Street • Hudson, New Hampshire 03051 • Tel: 603-886-6008 • Fax: 603-816-1291

TO: Brian Groth, Town Planner
Planning Board

FROM: Elvis Dhima, P.E., Town Engineer
Jim Michaud, Chief Assessor

DATE: October 19, 2021

RE: Request for Approval of Funds from Planning Board Tax Map Update

Town of Hudson currently has 3 inch resolution from Spring of 2020. This was partially funded (50%) by Planning Board's Tax Map Update Account 1312-505, which currently hold approximately \$19,611.50.

We have been notified of a state flyover from our consultant for 3 inch resolution and would like to take advantage to this opportunity to complete this in Spring of 2022. We have received a quote for the amount of \$34,000.

Engineering, Zoning and Assessing Department is asking the Planning Board to approve and recommend the expenditure to the Board of Selectmen.

Motion:

To approve and recommend 2022 aerial imagery flyover using Account #: 1312-505, for the amount of \$17,000.

October 19th, 2021

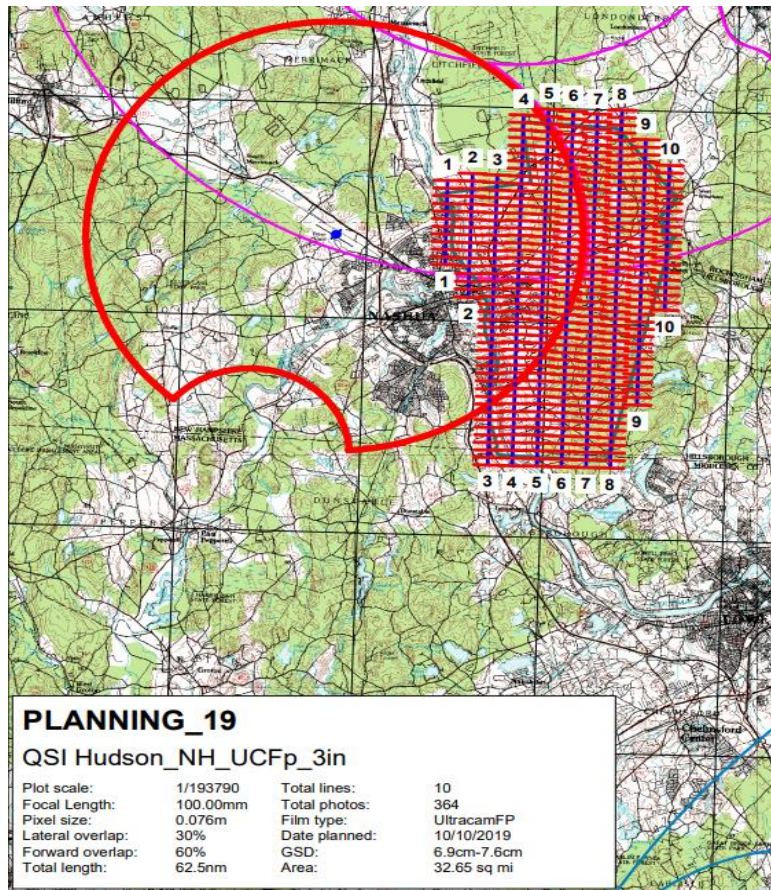
Town of Hudson
ATTN: Elvis Dhima – Town Engineer
12 School Street
Hudson, NH 03051

RE: Price Proposal – 2022 3in Ortho and Planimetric Update

Quantum Spatial, an NV5 Company (QSI), appreciates the opportunity to present to Hudson, NH, a price proposal for QL1 Lidar derivatives for the Town area of interest (AOI). The following is a brief synopsis of our services, recommended specifications, and associated costs for the area of interest.

1.0 Areas of Interest – Hudson, NH

The area of interest (AOI) for both the ortho and planimetric update is for all of Hudson, which is along Northern MA border. The entire capture area totals 32.5 square miles



2.0 Services

2.1 3in 4Band Orthos Acquisition & Processing

In 2020 Quantum Spatial did acquire 3in 4 band imagery as part of the USGS GPSC contract with the State of New Hampshire.

The new imagery will be collected with a large format digital camera in 4 bands (R, G, B, NIR) at 7.5cm (3”) ground sample distance (GSD) with 60% along-track overlap, and $\geq 30\%$ sidelap. Flight parameters will be adjusted to collect imagery with a native pixel size (ground sample distance) of 7.5 cm.

Aerial Photography Specifications	
Spectral Bands	Red, Green, Blue, NIR
Pixel Resolution	7.5cm GSD (or 63in)
Horizontal Overlap	60%
Vertical Overlap	$\geq 30\%$
Rectification	< 3 pixels RMSE
Delivery Format	8-bit, Tiled Geo-Tiff



Survey equipment placed by QSI crew.

Orthorectification will be accomplished using known coordinates of photo-identifiable features within the study areas. Direct georeferencing typically results in accuracies of < 3 pixels when compared to ground targets. Individual ortho-rectified TIFFs will be mosaicked ensuring that any remaining radiometric differences between images are corrected. All four bands will be rectified, mosaicked and edited concurrently as one process. Mosaic lines will be non-apparent by carefully blending and editing seam location. The resulting data product is geo-rectified 8-bit, 7.5 cm (3”) resolution imagery of the study area provided as tiled, color-balanced ortho-mosaic. Orthophotos will be collected during peak sun angles for the day, under clear conditions with minimal cloud cover.

2.3 Survey Control

QSI will use one or more appropriate methods to enable geo-spatial correction of aircraft positional coordinate data. These include conventional base supported ('BS') survey control, TerraPos® Precise Point Positioning ('PPP'), or Trimble® CenterPoint™ Post-Processed Real-Time Extended ('PP-RTX'). To verify lidar point calibration and enable accuracy assessment, our field crew will collect ground check points (GCPs) using GPS-based real-time kinematic (RTK) survey techniques. For an RTK survey, the ground crew uses a roving unit to receive radio-relayed corrected positional coordinates for all ground points from a GPS base unit set up over a survey control monument. Currently, the use of the 2020 imagery survey points are going to be used for the processing of the orthophotos so no new ground control will be collected. If our teams deems more control is need them our team will go out and collect where appropriate.

2.4 Planimetric Update

Feature updates to collect similar to that of the 2017 project:

- Roads
- Buildings
- Driveways
- Parking
- Sidewalks
- Manholes
- Catch basins
- Hydrants

Please note that sidewalks and driveways will be converted to polygons if they are not already



Figure: Town current features with update areas to collect

2.5 New Structure Layer

Structure features captured from the 2022 planimetric data will compare to the 2017 structure layer and will be a stand alone layer provided to the town.

Deliverables

Data will be delivered in UTM Zone 10, meters horizontal datum: NAD83 (2011), and vertical datum: NAVD88 (Geoid12B), **unless otherwise specified before final contracting.**

Imagery

Orthophotos

- Orthophoto tiles, 7.5 cm (3") GSD/resolution or better, *GeoTIFF format***Vectors**
- Survey Boundaries, *shapefile format*
- Orthophoto Index, *shapefile format*

Planimetrics

- **Geodatabase**

Schedule

QSI anticipates the aerial acquisition will be performed in Spring 2022 (March- May). Based on anticipated workload full delivery will be done within 8-12 weeks from date of collection.

Price

Price options are provided in the table below and broken-down pertaining to task

Town of Hudson, NH Ortho and Planimetric update.			
Option	AOI	Services	Total
Hudson, NH	32.5mi2	3in 4band Orthos	\$23,500
Hudson, NH	32.5mi2	Planimetric Update	\$9,500
Hudson, NH	32.5mi2	New Structure layer between 2017-2021	\$1,000
		GRAND TOTAL	\$34,000.00

Sincerely,



Drew Meren, GISP, Account Manager
45180 Business Ct. Suite 800 Sterling, VA 20166
Cell: 703-919-8038
Email: drew.meren@nv5.com

Signature for Notice to Proceed

Company: Town of Hudson
Name: Elvis Dima

Signature: _____ Date: _____

Quantum Spatial would like to receive this notice to proceed by 11/30/2021 to accommodate mobilization planning for Spring 2022.