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CONNECTICUT
SITING COUNCIL

STATE OF CONNECTICUT
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North Atlantic Towers, LLC and
New Cingular Wireless PCS, LLC Application : DOCKET #427
for a Certificate of Environmental
Compatibility and Public Need
for a Telecommunications Facility Located :
at 171 Short Beach Road or 82 Short Beach Road
East Haven or Branford, Connecticut.

: AUGUST 7, 2012

TOWN OF BRANFORD'S SUPPLEMENTAL PRE-FILED TESTIMONY

The Town of Branford hereby provides the following supplemental testimony of David Maxson, WCP, of Isotrope, LLC:

Having previously filed my testimony in the above-captioned matter and attended the hearing sessions in East Haven on July 10, 2012, I hereby offer this supplement to my testimony.

First, as a matter of housekeeping

1. **Do you have any changes or additions to the materials you submitted with your original testimony?**

   ANSWER:

Yes, I realized that my color coverage maps were submitted in the form of JPEG files (suffix ".jpg"), which were subsequently printed and scanned in black and white for posting on the Council's web site. To ensure the record is as clear and complete as possible, I respectfully request that the color PDF Exhibits appended hereto, labeled Exhibits G1, G2, G3, G4, and G5 (Collectively, "Exhibits G") be entered as a replacement set for the set of coverage maps (Exhibits A-D) originally submitted in

JPEG form. I have ensured they are labeled, and have included an additional existing AT&T site that is not indicated on the AT&T coverage maps, but whose coverage is included on the AT&T maps.

2. **Do you have additional information regarding the replacement maps you submit as Exhibits G?**

ANSWER:

Yes, I have obtained comparative coverage areas of the options presented in Exhibits G. While the applicants (AT&T/North Atlantic Tower) and intervenor (Verizon) have submitted coverage area assessments in their narratives, these assessments are unclear as to whether they represent proposed net new coverage or total new coverage provided including overlap areas with existing coverage. When locating new facilities to provide new coverage, in my opinion, it is more informative to compare only the new coverage provided at certain signal levels.[1]

The proposed site in East Haven, which the applicant finds to be acceptable, has a 10% advantage in new coverage compared to the Branford site. According to our model, the proposed 120 foot tower at 171 Short Beach Road in Branford would add 4202 people to the AT&T -82 dBm network coverage, while the 82 Short Beach Road tower in East Haven would add 4658 people. Similarly, the consulting engineering report of C-Squared Systems shows a greater population of 4316 reached from the East Haven Site than the 4133 from the Branford site. This analysis is consistent with the Verizon analysis that shows the overall PCS and Cellular band coverage from East Haven affects a larger geographical area than from Branford.

Based on the foregoing, the East Haven tower is not only shorter than the

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[1] Where there is overlap from a new facility with existing coverage from other sites, there is the potential for capacity improvements in the overlap area; however, the applicant does not employ any measures of capacity to demonstrate need, and there is no information that suggests the areas already served from other facilities have a capacity shortfall.

Branford tower, and overall is less impactful on the scenic environment, but also the East Haven site provides a better coverage outcome.

3. **Besides multiband antennas, what other methods are used to minimize the number of antennas used at wireless facilities?**

ANSWER:

Besides multiband antenna technology, another technology that is in common use at wireless facilities in general and at some AT&T facilities in specific is the Multi-Carrier Power Amplifier, or "MCPA". In testimony on July 10, 2012, the applicants' outside engineering consultant C-Squared Systems explained that once a wireless signal is amplified to full power for transmission, some of that power can be lost if the signal has to be combined with another full power signal on the same radio band. For example, if AT&T chooses to put up two radio signals on its cellular spectrum in one sector of a cell site, it may simply opt to use a second antenna for the second signal in the same band. If a common full power combiner were utilized to reduce the number of antennas, the combiner will inefficiently dissipate some of the power, resulting in slightly reduced signal output (about 3 or 4 dB reduction). From this testimony, one might get the impression that such a power loss is detrimental and unavoidable.

Completing the explanation of how same-band signals affect network performance or not, the loss of power can be irrelevant or avoidable. In some cases, such a reduction in power has no material impact on coverage (such as when the terrain is the primary limiter of coverage). Also, carriers do not always run their signals at full power, often turning down the power levels from their cell sites to limit interference anyway, leaving the possibility that power can be increased enough to compensate for combiner losses.

Finally, in cases where the carrier determines the need to combine same-band signals on one antenna, and determines the need to maintain full power output for each channel, it employs an MCPA. The MCPA works by taking in the signals to be combined while they are still at low power levels. The power losses in the combining process are made up in the final joint-amplification of the MCPA. I have attached as Exhibit H information about one brand of MCPA. Based on the foregoing, the MCPA is a widely used tool to address the concerns expressed by the applicants' outside engineering consultant regarding signal combining on antennas.

4. **How will the use of a "unipole" tower at either of the cell sites proposed by AT&T affect AT&T's network in the Short Beach area?**

ANSWER:

A requirement to install a unipole in the present matter would have no material impact on the quality of the AT&T network in the subject area, compared to other antenna mounting configurations. It is very important to stress that each cell site presents a variety of engineering considerations that wireless engineers evaluate and for which they select the best available tools for the job. If North Atlantic Tower were required to install a concealed-antenna monopole (also known as a unipole, slick-stick, or flagpole-style monopole), AT&T RF engineers would develop a system design that accommodates the nature of the tower. There is no evidence on the record that in the present case there is any difference in AT&T's projected network performance between using a unipole and using a full-frame exposed antenna mount. Considering the ordinary nature of the proposed service area, I anticipate no peculiar conditions that would militate against a unipole design. *Coverage* from the same height is essentially no different with or without a unipole design. *Capacity* demands can be handled by the use of the multiple bands licensed to AT&T in this region (using multiband antennas), and by the use of multiple channels in any one band (using MCPA and similar

technology, if and when necessary). In the subject area there is a substantial amount of built-up environment, which the technical literature demonstrates is apropos for the use of cross-polarized antenna elements to provide diversity reception. Multiband antennas are available with cross-polarization.

5. **If the Council were to approve a 103 foot tall unipole tower at the 82 Short Beach Road site, and it were to fill up with three wireless carriers, what prevents a fourth carrier from applying for and obtaining permission to increase the height of the tower?**

The most obvious reason could be structural. Even so, the gatekeeper for approval is in the permitting process. Primarily, in my experience, regulatory bodies always weigh the relative impacts of several competing interests in siting wireless facilities. The Council, like many other bodies I testify before, is tasked to reduce proliferation of cell towers by maximizing tower sharing by multiple carriers, but only if such sharing is environmentally compatible. I have never seen a regulatory body blindly approve a tower tall enough to accommodate all the carriers in the marketplace without first considering the optimum height and design for compatibility in the environment. As a result, a tower sharing capacity is often limited to that height which is environmentally compatible. As I understand it, there is no requirement in Connecticut to minimize the number of tower facilities by maximizing height for co-location at the expense of creating environmental incompatibility of any particular facility.

In the present case, if the tower were approved at 103 feet at 82 Short Beach Road, with design conditions published in the approval (such as no FAA lighting, unipole design, etc), the tower could accommodate at least three carriers, in my opinion. (We know that AT&T and Verizon find the tower desirable; there are no facts regarding any potential additional carriers, so it is premature to say any other carrier would or would

not be interested in the tower site.) Assuming an additional carrier occupies a third position on the unipole tower (at about 80 feet), the question is whether a fourth carrier could possibly surface and successfully demand the tower be extended.

If there were an additional carrier to apply for a greater height on a 103 foot tower at 82 Short Beach Road, that had been conditioned as described above, the carrier would see that the environmental criteria upon which the original approval was granted included limitations on height and appearance of the tower in order to protect the environment from proliferation of tall, obtrusive towers. They would be on notice that a different solution is in order, even if it means proposing a new low-profile tower in the region.

6. **In your experience, how have regulatory bodies addressed the tension between minimizing the proliferation of towers and minimizing the individual and collective impacts of the towers?**

I have worked for the nationally respected Cape Cod Commission on numerous wireless matters as well as for scores of municipalities. On the one hand, over a decade ago I first used the term "flexibility" to describe the benefits to the carriers of allowing tall towers with full frame exposed antenna mounts when it was reasonable to do so. This resulted in the Cape Cod Commission's approval of a tower at the Truro town landfill because its visual impact was negligible; this tower was a tall, lattice, full frame antenna mount tower. The Commission subsequently approved other such towers at locations that were equally suited to maximizing flexibility and minimizing architectural considerations because of their lack of visibility.

On another hand, I worked with the Commission in its process to develop a standard for lower-profile towers (that were inherently limited in tower-sharing space) that would

require no Commission approval process. The Commission's choice was to enable the deployment of unipoles up to 80 feet in height with only municipal review. This is a prime example of how the balance of quality and quantity of tower sites is achieved in a regulatory environment.

In Connecticut, the Council's tower database (CSC approved sites only) shows that about 1.5% of the Council approved tower facilities are "(stealth) flagpoles". AT&T is listed as being on about 18 of the about 30 "flagpole" installations in Connecticut. References to "flagpole" are the only indications of a unipole design. In my experience, a much larger percentage of facilities use unipoles in the other southern New England States. I estimate that at least 5 to 10% of new tower approvals in Massachusetts and Rhode Island are unipole designs. Exhibits I and J show two unipoles in which AT&T has antennas, one in Concord, MA and one on Martha's Vineyard.

In summary, the land use boards and professionals with whom I work generally give deference to potentially "more" shorter towers with less co-location space on each, rather than "fewer" taller towers with maximum co-location potential when the result is architecturally and environmentally more compatible. The unipole design is widely regarded as preferable to exposed antenna configurations in developed areas with scenic and residential use. My Branford clients share this perspective for their community.

Respectfully Submitted,

The Town of Branford,

By Keith R. Ainsworth

Digitally signed by Keith R. Ainsworth
DN: cn=Keith R. Ainsworth, o=Evans, Feldman and Ainsworth, ou=EFA, email=krainsworth@snet.net, c=US
Date: 2012.08.07 14:49:26 -04'00'

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CERTIFICATE OF SERVICE

This is to certify that a true copy of the foregoing was deposited in the United States mail, first-class, postage pre-paid this 7th day of August, 2012 and addressed to:

Ms. Linda Roberts, Executive Director, Connecticut Siting Council, 10 Franklin Square, New Britain, CT 06051 (1 orig, 15 copies, plus 1 electronic) (US Mail/electronic).

North Atlantic Tower/New Cingular, LLC c/o Lucia Ciocchio, Esq., Christopher Fisher, Esq., Cuddy & Feder, LLP, 445 Hamilton Avenue, 14th floor, White Plains, NY 10601 (203) 761-1300, (914) 761-5372 fax cfisher@cuddyfeder.com lchiocchio@cuddyfeder.com (electronic and US Mail)

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Keith R. Ainsworth

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DN: cn=Keith R. Ainsworth, o=Evans, Feldman and Ainsworth, ou=EFA, email=krainsworth@snet.net, c=US
Date: 2012.08.07 14:57:57 -04'00'

Keith R. Ainsworth, Esq.

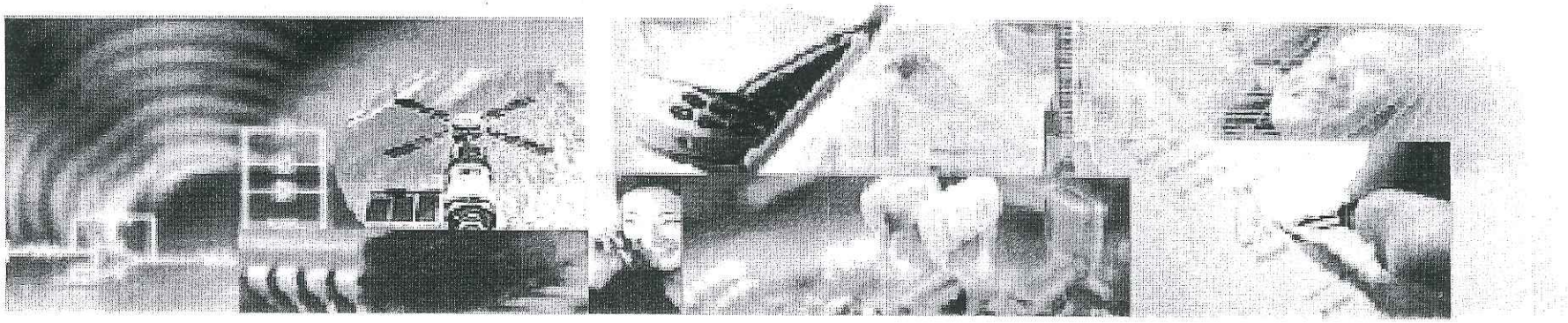
Exhibit H

MCPA Information from 2006

TM-MCPA

For Cost Effective

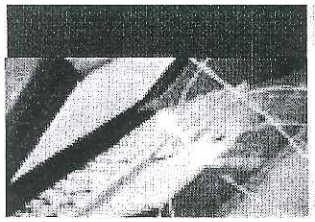
Coverage Extension or Capacity Upgrade



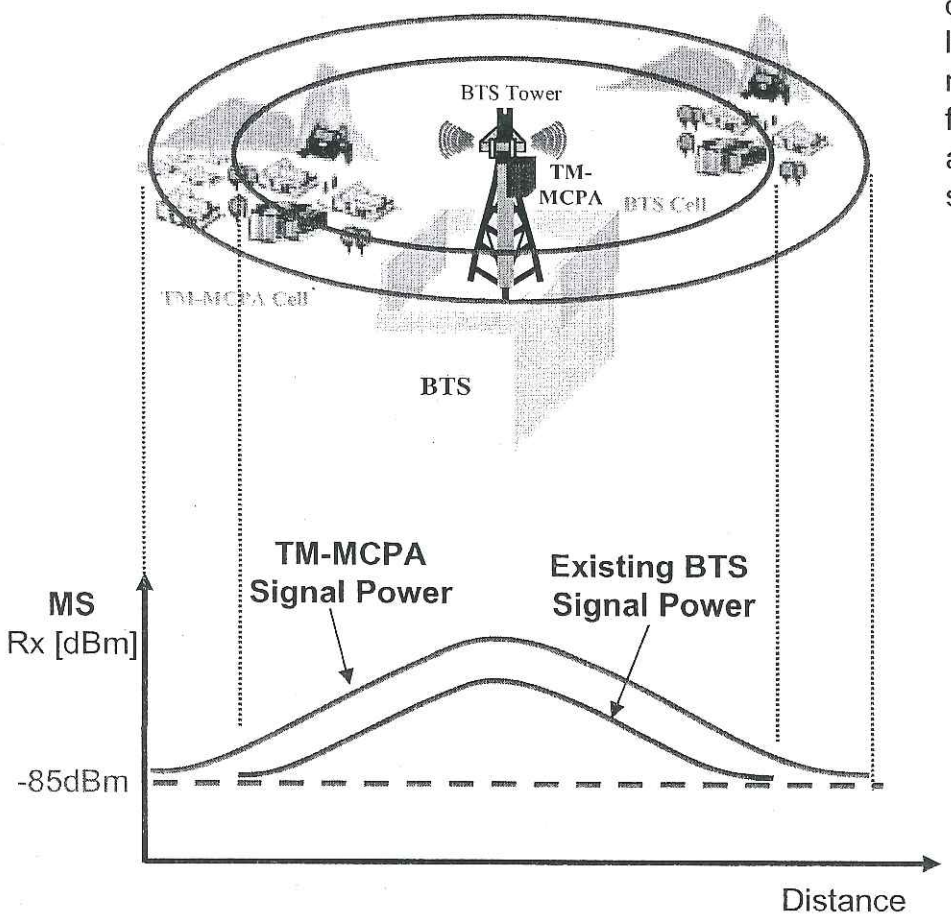
HFR,Inc.
for Mobile Internet

August, 2006

Product Enquiry & Local support contact sales@pacificwave-wireless.com
Another related component can be found at www.pacificwave-wireless.co



TM-MCPA Overview



Due to rapid changes in wireless network environment, network operators are now faced with various infrastructure solutions and cost issues in upgrading wireless network. HFR's MCPA product line (Tower-Mounted and Ground-Mounted) provides cost effective network coverage extension and capacity upgrade solution. Apart from obvious coverage extension, sharing of existing RF cable and antenna when introducing new service channel for capacity or service upgrade is the major advantage of this system.

TM GSM/GPRS/EDGE MCPA – Advantages

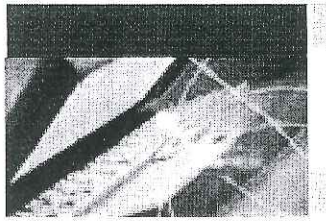
- Increase channel count per antenna while maintaining power level per channel
- Increases coverage area for new cell designs
- Avoid coverage reduction when increasing number of channels in existing systems
- Tower-Mount Feature to maximize output power at the Antenna

TM GSM/GPRS/EDGE MCPA - Management

TM-MCPA can be easily monitored and controlled using built-in microprocessor. Following extensive features are included for managing system easily.

- User selectable downlink/uplink RF gain
- Parameter monitoring and alarm reporting
- Easy setup & maintenance feature

Product Enquiry & Local support contact sales@pacificwave-wireless.com
Another related component can be found at www.pacificwave-wireless.com

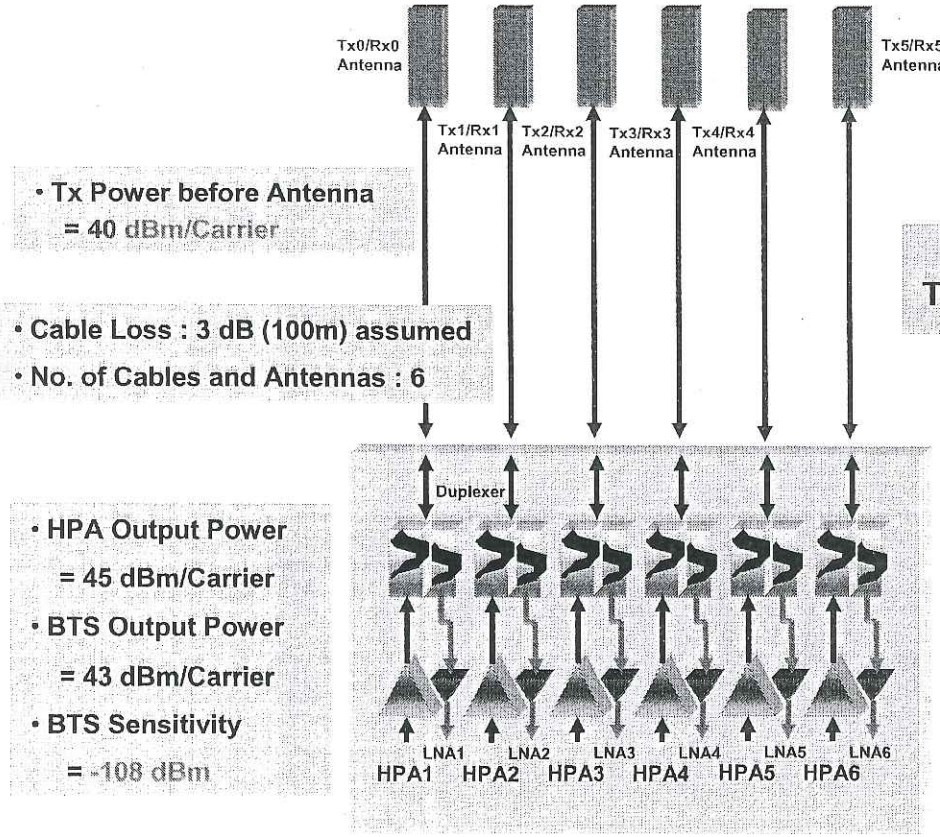


Application - 6 Carrier BTS (Case 1)

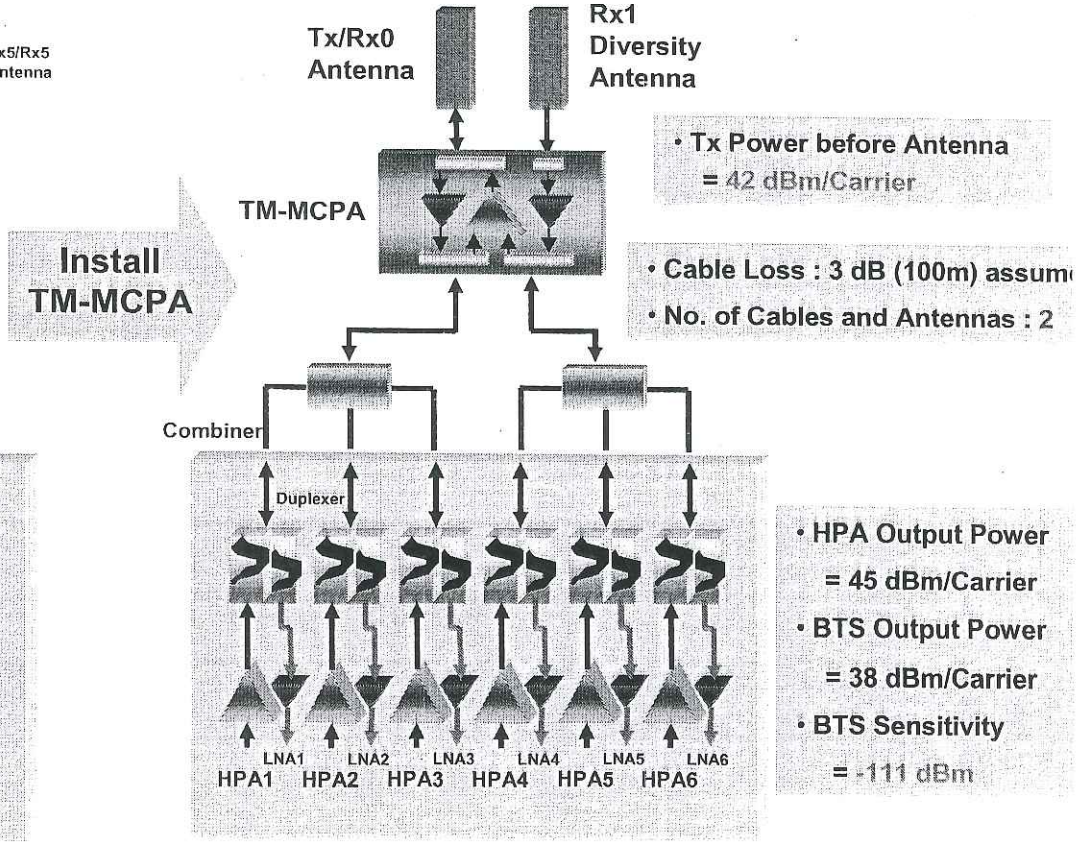
Benefits

- ❖ Tx Power : 40 dBm ⇨ 42 dBm / Carrier
- ❖ BTS Sensitivity : -108 dBm ⇨ -111 dBm
- ❖ Avoid coverage reduction when increasing no. of carriers from 2 or 4 to 6.

Service Configuration without TM-MCPA



Service Configuration with TM-MCPA



Product Enquiry & Local support contact sales@pacificwave-wireless.com
Another related component can be found at www.pacificwave-wireless.com

Exhibit I

Concord Massachusetts Unipole with AT&T Facility

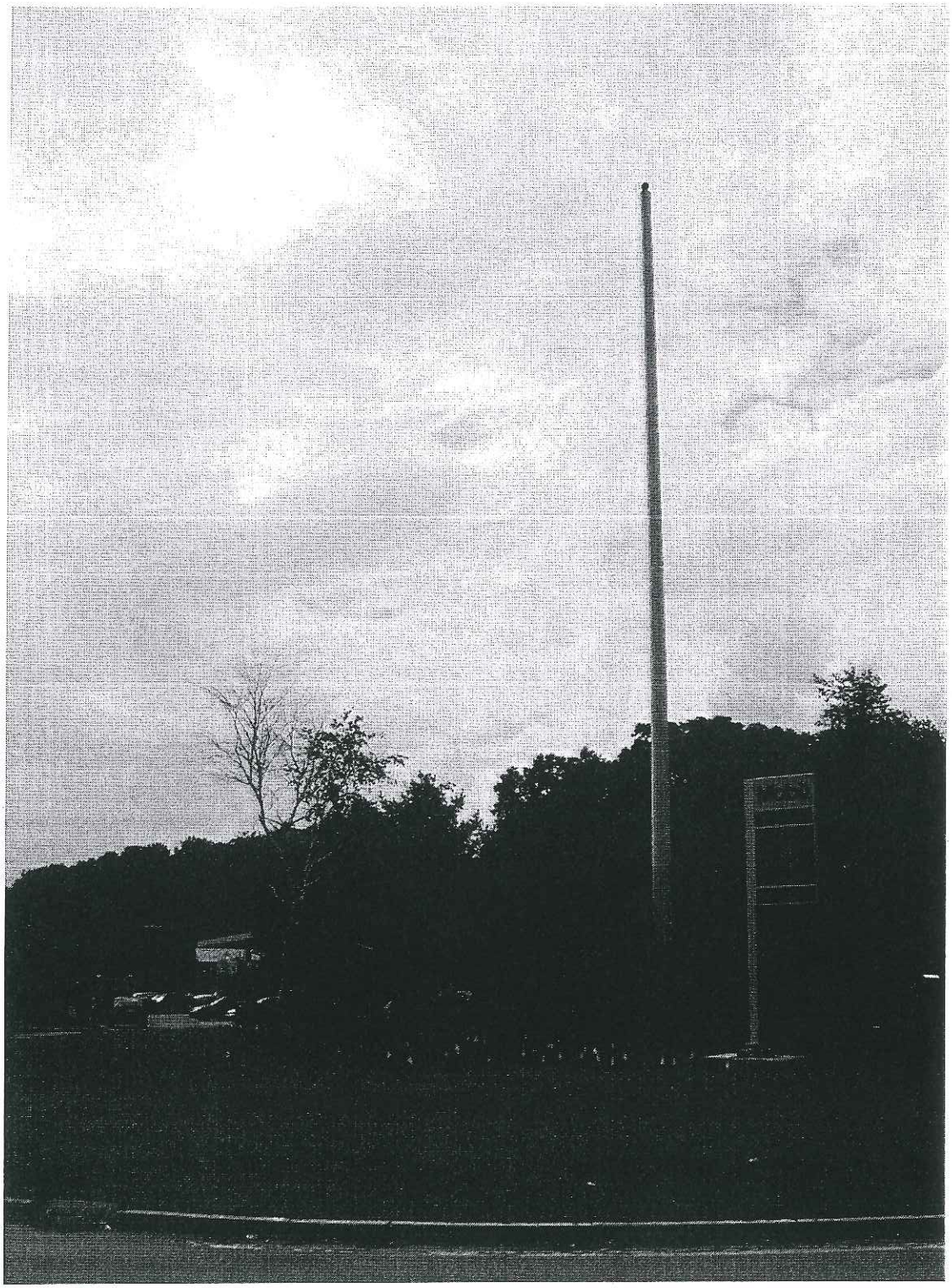
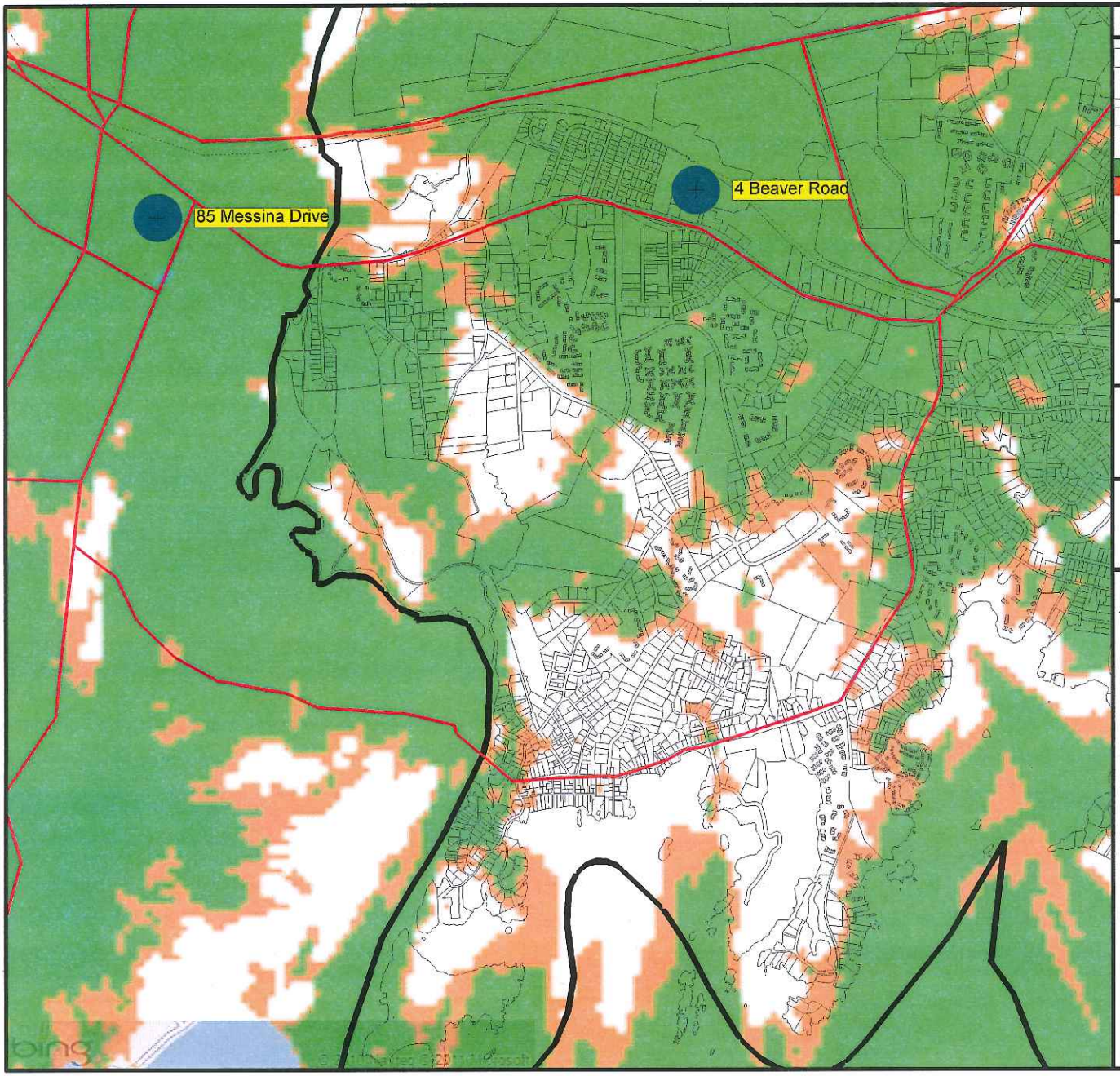


Exhibit J

West Tisbury, Martha's Vineyard, Massachusetts Unipole with AT&T Facility

Exhibits G1, G2, G2, G4, G5

Replacement Isotrope Coverage Maps



SIGNAL™: Branford

Town Boundaries

Rail

parcels

Received Power at remote

> -74.0 dBmW

-82.0 to -74.0 dBmW

< -82.0 dBmW

Display threshold level: -85.0 dBmW

Notes

ATT Existing

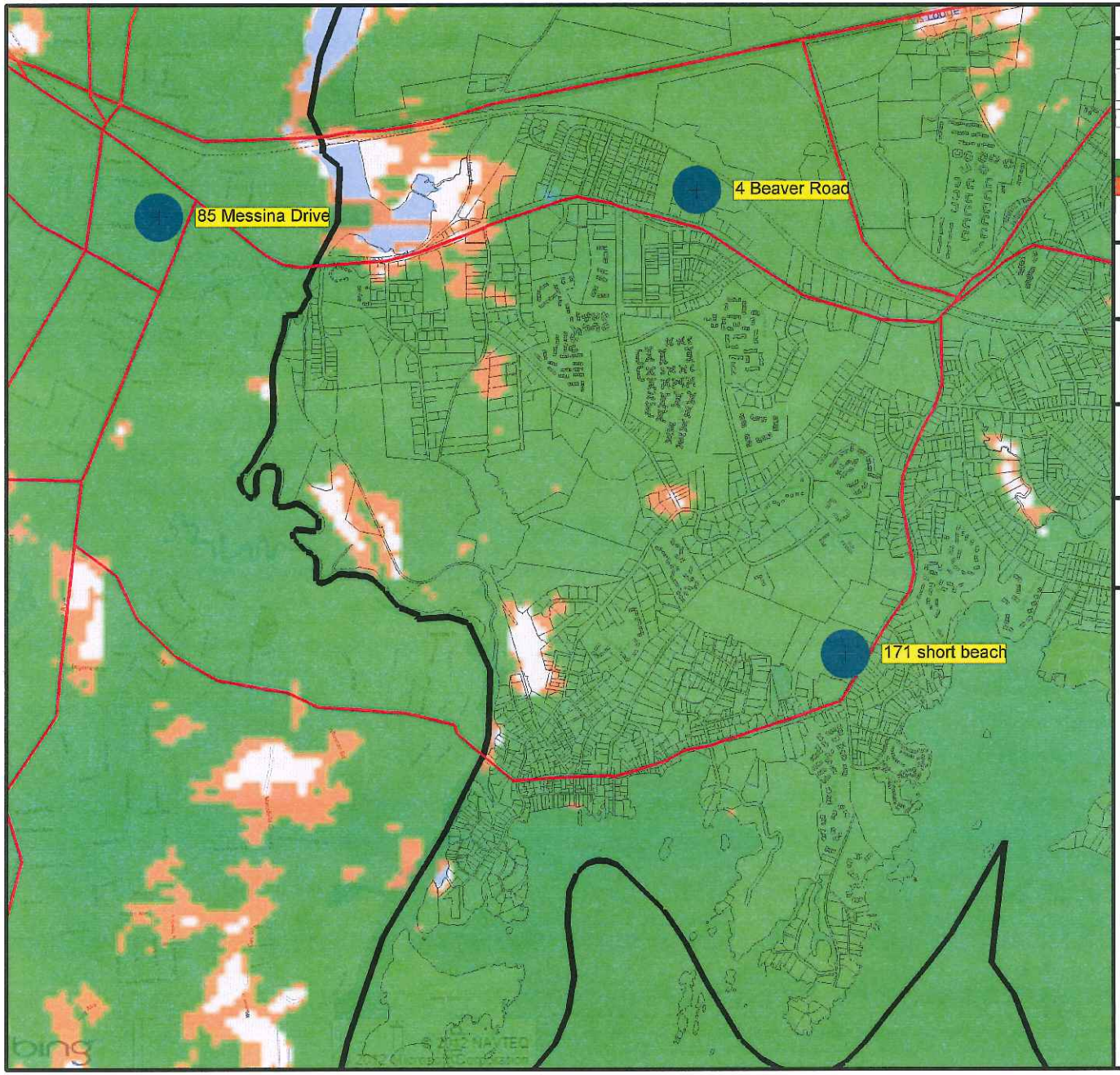
FEET

-500 0 2000

RFMaps.com

Isotrope, LLC.

G-1 Mon Jul 16 15:30:21 2012



SIGNAL™: Branford

Town Boundaries

Rail

parcels

Received Power at remote

> -74.0 dBmW

-82.0 to -74.0 dBmW

< -82.0 dBmW

Display threshold level: -85.0 dBmW

Notes

ATT Existing
171 Short Beach at 120ft

FEET

-500 0 2000

RFMaps.com

Isotrope, LLC.

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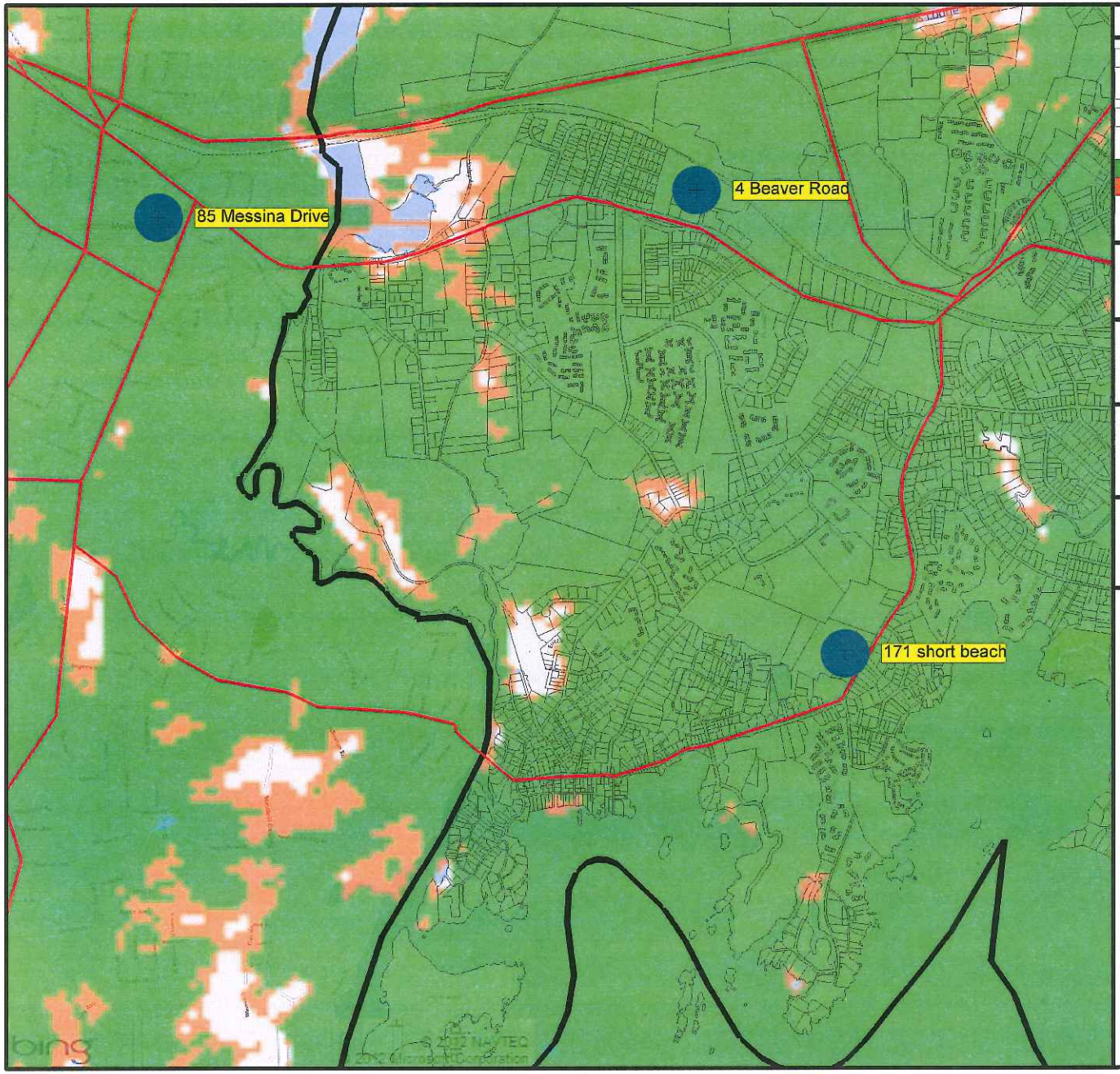

SIGNAL™: Branford

Town Boundaries

Rail

parcels

Received Power at remote

> -74.0 dBmW

-82.0 to -74.0 dBmW

< -82.0 dBmW

Display threshold level: -85.0 dBmW

Notes

ATT Existing
171 Short Beach at 100ft

FEET

-500 0 2000

RFMaps.com

Isotrope, LLC.

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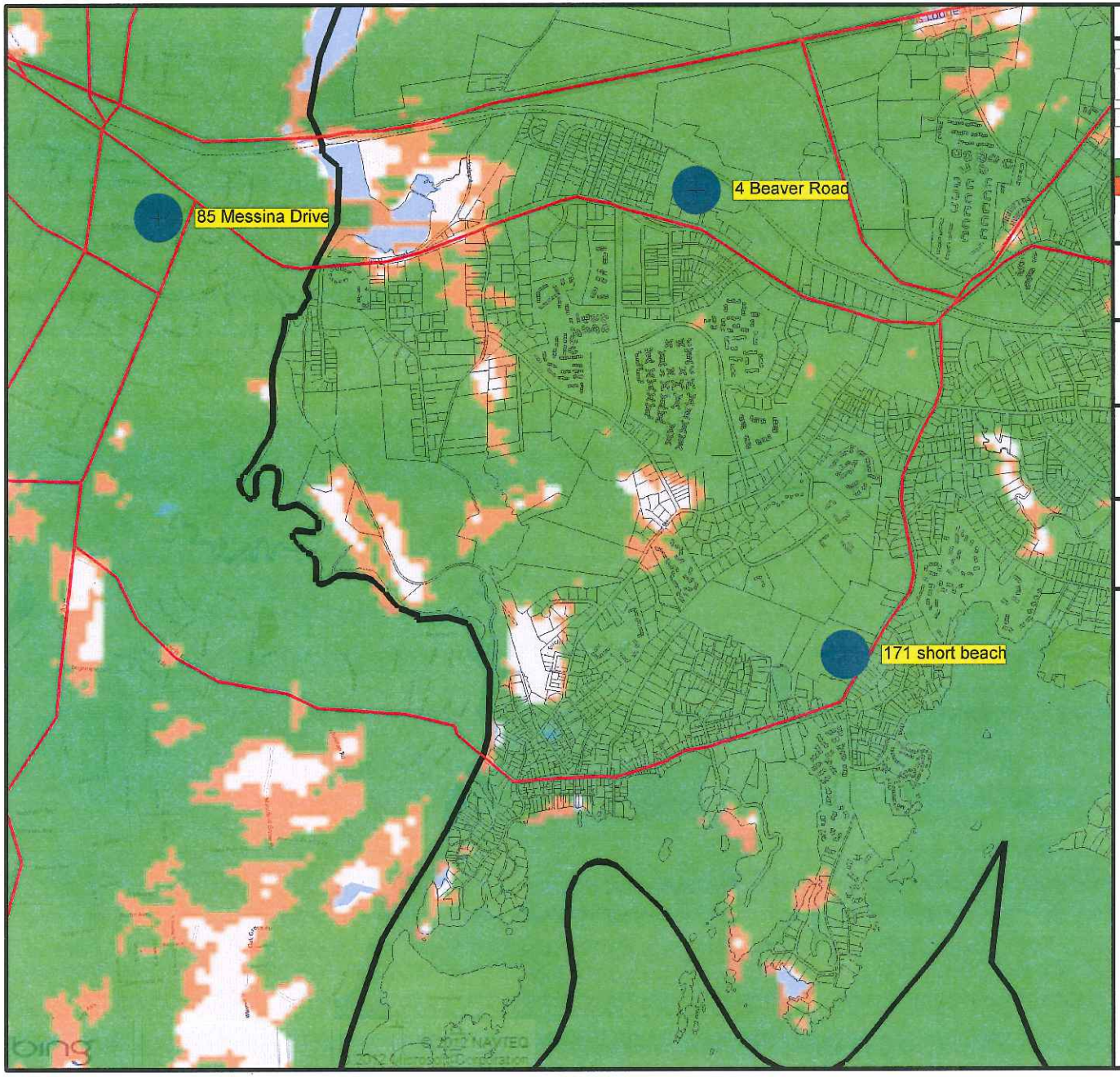


SIGNAL™: Branford

Town Boundaries
Rail
parcels

Received Power at remote

> -74.0 dBmW
-82.0 to -74.0 dBmW
< -82.0 dBmW

Display threshold level: -85.0 dBmW

Notes

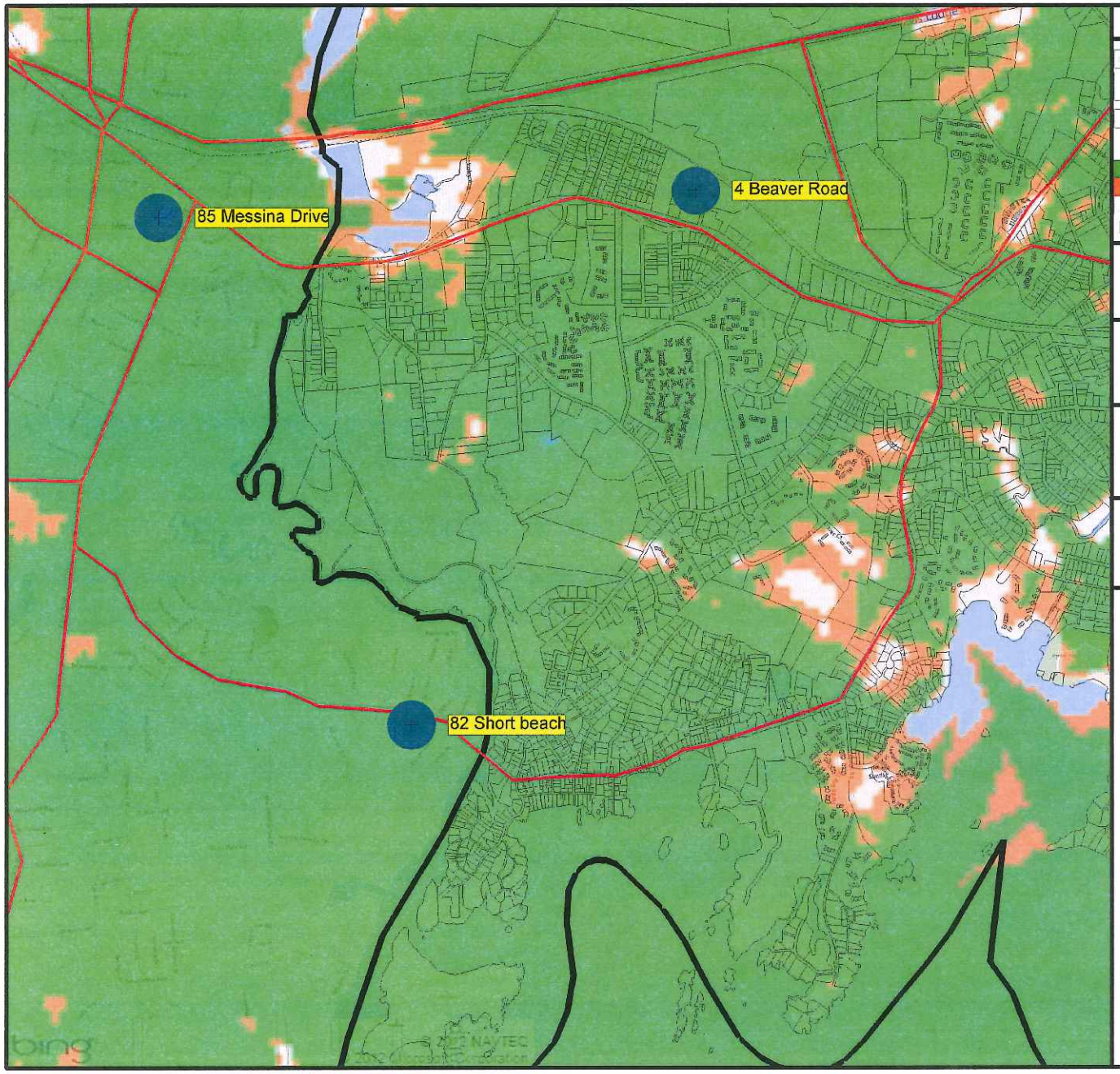
ATT Existing
171 Short Beach at 80ft

FEET
-500 0 2000

RFMaps.com

Isotrope, LLC.

G-4 Mon Jul 16 15:41:20 2012



SIGNAL™: Branford

Town Boundaries

Rail

parcels

Received Power at remote

> -74.0 dBmW

-82.0 to -74.0 dBmW

< -82.0 dBmW

Display threshold level: -85.0 dBmW

Notes

ATT Existing
82 Short Beach at 100ft

FEET

-500 0 2000

RFMaps.com

Isotrope, LLC.

G-5 Mon Jul 16 15:44:09 2012