

This request for construction permit is for a roof mounted amateur radio tower and antenna at:

??

Maple Grove MN 55311

For the owner:

Roger Roth

Federal Communications Commission issued amateur Radio sign: K0MPH

Telephone: ??

E-Mail: ??

The tower and antenna will be mounted on top of the garage roof. The antenna will be within the side and front set back areas (see attached property sketch, plot plan, front and side elevation drawings).

- The top of the antenna will be 36 feet above the driveway in front of the house. The nearby trees will be an estimated 5 to 10 feet taller than the antenna.
- If the antenna tower failed where it is attached to the roof, it would still be 21 feet away from the high tension utility line in front of the house.

The antenna will be a Hexagonal Beam by K4KIO (see attached specification sheet)

- The weight of the antenna is less than 25 pounds
- The antenna has a wind load area of less than 6 square feet
- A rotator will be used to turn the antenna to any desired direction.
- The antenna is symmetrical around its axis with a turning radius of approximately 11 feet. With the tower mounted approximately at the center of the garage roof, the antenna should not overhang the garage foot print by more than 1 foot.

The tower will be a Glen Martin Model RT-1832 roof tower (see attached owner manual)

- The tower has the capability of supporting a 110 pound antenna. Therefore: The tower is capable of supporting the proposed 25 pound antenna.
- The tower has the capability of supporting an antenna load of 12 square feet of wind load area (30 pounds per square foot or 86.6 miles per hour wind) without the use of guy cables. Therefore: The tower should withstand the wind forces on the proposed 6 square foot antenna.

The tower will be mounted on top of the garage roof (see attached drawings)

- The roof will be reinforced to withstand the expected additional weight of the tower, rotator, and antenna (108 pounds) and the expected additional load due to

wind. The roof reinforcements are per the manufacturers recommendations. 2 X 6 blocking will be installed between the 2 X 6 rafters under the tower.

- The load will be distributed to seven rafters on each side of the roof by two 2 X 8s fastened to the rafters with lag bolts and large washers.
- The tower will be fastened to the 2 X 8s (through the roof and blocking) by bolts and large washers. Glen Martin recommends using lag bolts into the rafters or blocking. Other Glen Martin roof tower users have used bolts through the blocking and 2 X 8s., which are deemed to be a stronger solution.
- The roof will be sealed to prevent leaks.

Guy cables will be attached to the tower to spread the load to other portions of the roof.

- The guy cables will be lightly tensioned so as to take only a portion of the wind load and so there will be only a small static load on the tower due to the guy cable tension.
- The guy cables have the function of converting some of the uplift force (due to the wind) on the windward tower leg(s) (tower leg(s) in tension) into a downward force on all of the tower legs.
- The worst case estimated guy tension is 1110 pounds (90 miles per hour wind and the base/roof taking no load). The actual tension in the guy is difficult to calculate without an accurate computer model of the tower and roof structure because the tension depends on the amount of flexing in the tower and roof structure.
- At the guy anchor points, the roof will be reinforced with blocking between the rafters and 2X6 brace between two rafters. Lag bolts will fasten the brace to two rafters.

Lightning ground:

- The tower will be grounded with two eight foot ground rods. The ground rods will be connected to the tower with #8 copper ground cable using appropriate clamps.
- The antenna feed line (coaxial cable) shield will be bonded to the tower at the bottom of the tower. A lightning arrestor will protect the center conductor.

Attachments:

1. Property Sketch
2. Plot plan showing location of antenna tower on the garage.
3. Front elevation drawing showing location of antenna tower on garage.
4. Side elevation drawing showing location of antenna tower on garage.
5. Tower mounting detail drawing showing details of tower attachment to roof.
6. Tower mounting detail drawing showing top view of roof reinforcements.
7. Antenna specifications

8. Glen Martin tower owners manual (shows tower specifications and recommended roof reinforcements)
9. Page from Glen Martin catalog, further showing roof reinforcements.
10. Copy of E-Mail from Larry Huff (Chief Plans Examiner, City of Maple Grove) in response to my questions about city requirements.