A

# TORNADO PROJECT SUMMARY SHEET

F=1 ONT

1. DATE AND TIME OCTOBER 8, 1977 1830 EST

2. LOCATION OR PATH (attach map)

VCNTY TIVERTON TO UNDERWOOD 0697717

3. PATH LENGTH ☐ NOT KNOWN ☐ <1mi; ☐ 1-4mi; ☐ 5-10mi; ☒ ~~11-50mi~~ 4 Km; ☐ LENGTH IF>50mi

4. PATH WIDTH 80 M. 5. TORNADO PART OF SQUALL LINE? ☐ YES; ☐ NO; ☐ UNKNOWN:

6. ANY UNUSUAL COLORATION? ☐ YES; ☐ NO; ☐ UNKNOWN

7. ANY UNUSUAL SOUND? ☐ YES; ☐ NO; ☐ UNKNOWN

8. IF ANSWER TO 6 OR 7 YES, ELABORATE;

9. LIST ANY ASSOCIATED PHENOMENA (Such as hail, vivid lightning heavy rain, no rain, etc.)

10. TOTAL DAMAGE ESTIMATE $ U 11. TOTAL DEATHS NONE

12. TOTAL INJURED NONE 13. TOTAL HOMELESS ONE FAMILY

14. LIST ALL REFERENCES

The News, Kincardine Oct 12, 1977

Report on the Tiverton Underwood Tornado. Oct 10, 1977 by M. J. Newark.

The Beacon Times, Port Elgin Oct 12, 1977

15. SUMMARIZE REMARKS PERTAINING TO (a) FUNNEL; (b) INTERESTING OR CAPRICIOUS EVENTS.

(a) no remark

WORKSHEET

IDTO 0697717

(1) ORIGIN $x$ 17454900

$y$ 4897800

(2) LIFT-OFF $x_1$ 17462000

$y_1$ 4906700

(3) $(x_1 - x)$ = .7100

(4) $(y - y_1)$ = 8900

(5) Standard Error $S_x$ 30 C

(6) Standard Error $S_y$ 30 C

(7) DAMAGE LENGTH

$$L = [(x_1 - x)^2 + (y - y_1)^2]^{1/2}$$

(3)+(4) [→r,θ] = .11385

(8) $\alpha = \tan^{-1} \frac{|y - y_1|}{|x - x_1|}$

[X↔Y] = 51°

(9) Standard Error $S_L = (S_x^2 + S_y^2)^{1/2}$

(5)+(6) [→r,θ] = 42 m C

(10) $\beta = \frac{\tan^{-1} S_L}{L}$

(7)+(9) [→r,θ]

[X↔Y] = 1°

NE Quad $\phi = 90 - \alpha$

NW Quad $\phi = 270 + \alpha$

SW quad $\phi = 270 - \alpha$

SE quad $\phi = 90 + \alpha$

(11) $\phi$ = 219°



Sound.
LAKE
HURON
FOR BRUCE TRAIL INFORMATION
PLEASE WRITE TO
BRUCE TRAIL ASSOCIATION
33 HARDALE CRESCENT
HAMILTON, ONTARIO
CANADA
44°45'
44°30'
44°00'
81°30'
81°00'
LONGITUDE WEST OF G
WIARTON
KEPPEL
AMABEL
SOUTHAMPTON
PORT ELGIN
ARRAN
DERBY
SAUGEEN
ELDERSLIE
SULLIVAN
BRUCE
KINCARDINE
GREENOCK
BRANT
WALKERTON
HANOVER
CARRICK
CULROSS
HURON
KINLOSS
ASHFIELD
WEST WAWANOSH
EAST WAWANOSH
TURNBERRY
HOWICK
Sauble Beach
Sauble Beach North
Chesley
Paisley
Tara
Teeswater
Mildmay
Lucknow
Ripley
Riversdale
Chepstow
Formosa
Tiverton
Underwood
Eskdale
Cluny
Burgoyne
Dunblane
Lockerby
Elmwood
Hepworth
Elsinore
Allenford
Chippawa Hill
Point Clark
Boiler Beach

REPORT ON THE TIVERTON-UNDERWOOD TORNADO OF SATURDAY OCT 8 1977

M.J.NEWARK and P.Elms.

## Synoptic Situation

An occluding low pressure area was moving across the upper Great Lakes northeastwards into northern Ontario. A trailing cold front crossed Lake Huron during the late afternoon. GOES imagery showed that a very narrow squall line formed along the front early in the day and radar observations from London indicated radar tops 9.5 to 10.5 km as this line,oriented north to south,moved into southern Ontario.

## Associated Severe Weather

During the evening of October 8 1977, (i) a tornado was reported near Toledo, Ohio; (ii) golf ball sized hail fell at Essex, Ont; (iii) severe damage, presumably from a tornado touchdown was reported on the farm of Jim Cudney, located in Chatham township on the 6th concession road and Kent Bridge Road (about 14 km northeast of Chatham). The damage estimate amounted to about $100,000; (iv) a tornado was reported between Tiverton and Underwood, Ontario.

## The Tiverton- Underwood Tornado

On monday October 10 1977 the Tiverton area was examined from the air. The tornado touchdown area was clearly visible in a cornfield on the 8th concession of Kincardine to the east of highway 21 (fig 1). The path through the field was about 10-12m wide and snaked towards the northeast along a sinuous "S" shaped path. The same pattern was also visible in a cornfield belonging to Ronald Brown on the 4th concession of Bruce. Debris was scattered along the length of the track with the last visible pieces about 400m north of Underwood. The country was mostly open pastureland and fields but there were a few small tracts of bush. There was surprisingly little damage to the trees in these areas, in fact there was no marked damage swath through the bush at all, which was unexpected in view of the power displayed by the tornado as it wrecked nearby farm buildings. The tornado funnel could of course have been aloft as it passed over the treed areas.

The overall length of the track was 11.2 km while the width of the damage was about 80m. Debris from damaged buildings, besides being strewn along the length of the track was also thrown to the left perpendicular to it (fig 2). Farm shade trees also fell towards the left of the track and perpendicular to it.

TIVERTON-UNDERWOOD TORNADO CONTD.

An examination of the Dennis Todd farm, highway 21 just east of Tiverton revealed extensive damage to farm outbuildings. The Todd family was sheltering inside their house when the storm struck. The window glass shattered and flew in across the room, luckily missing the occupants, then what was left of the window went outside. They heard a roaring crash and looking outside saw that their outbuildings were gone or else badly damaged. A frame building with sheet metal siding was completely gone. The tractor which had been inside it was overturned with all four wheels in the air. A 4 ton combine was moved several feet and its solid steel 2 inch diameter axle was snapped by the weight of the machine bearing upon it.

Buildings which had been only partially damaged along the storm track suffered the worst on the side with eastern exposure, ie towards the right side of the tornado track. Since the rotation of the funnel was cyclonic ( as evidenced by the whirls in corn fields) and the strongest force seemed to be exerted towards the left of the track, it would appear that the leading edge of the funnel was responsible for most of the damage. On the Todd farm only a small amount of debris had in fact been carried towards the right of the track.

In all, 4 farms, a cement plant and several buildings in Underwood were damaged by their unwelcome visitor.

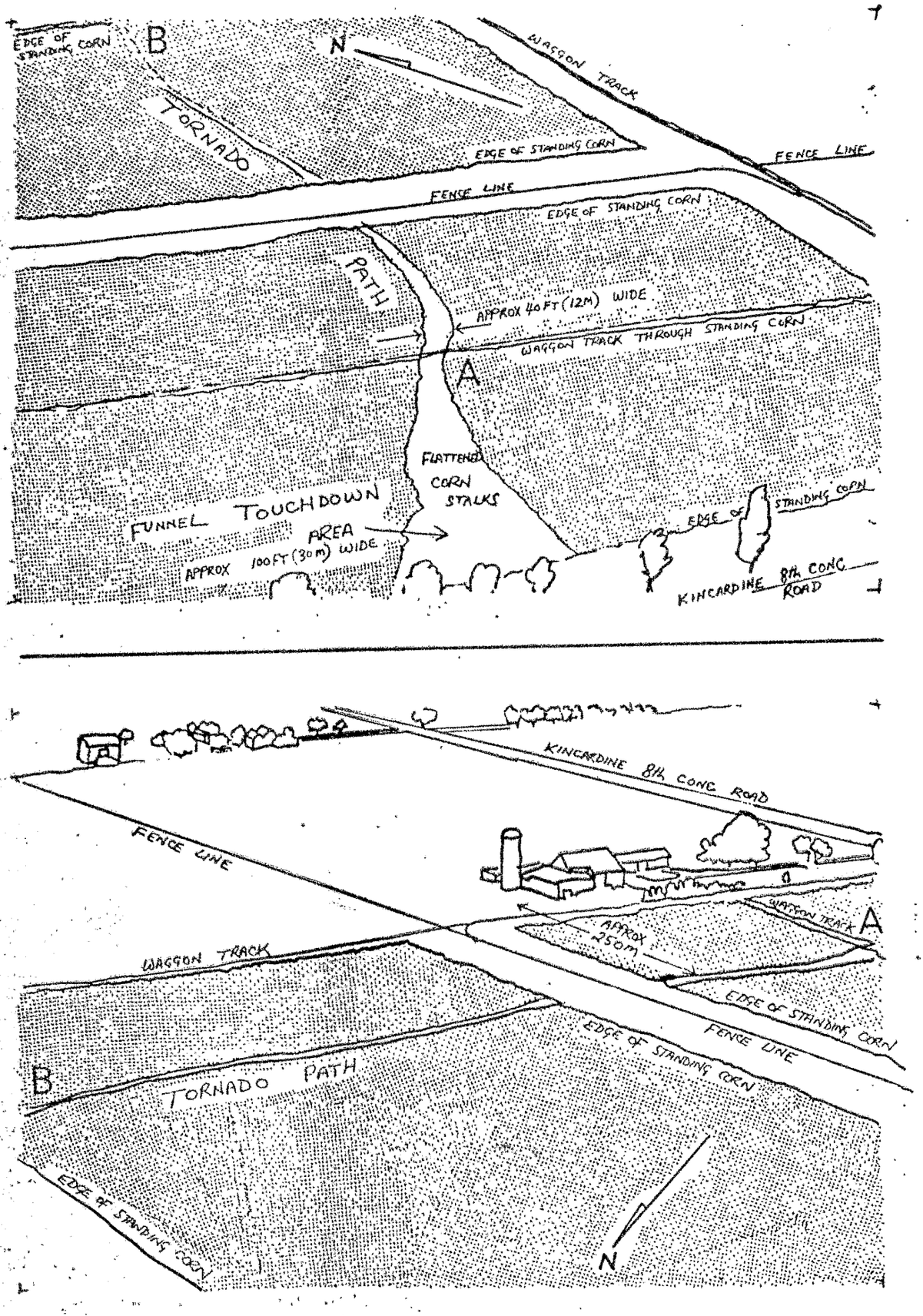



Fig 1. The tornado touchdown area and its "S" shaped path through a cornfield on the 8th concession road of the township of Kincardine.
The bottom view shows the path between A and B in the top view but from a different angle.
Both views reproduced from aerial photographs.

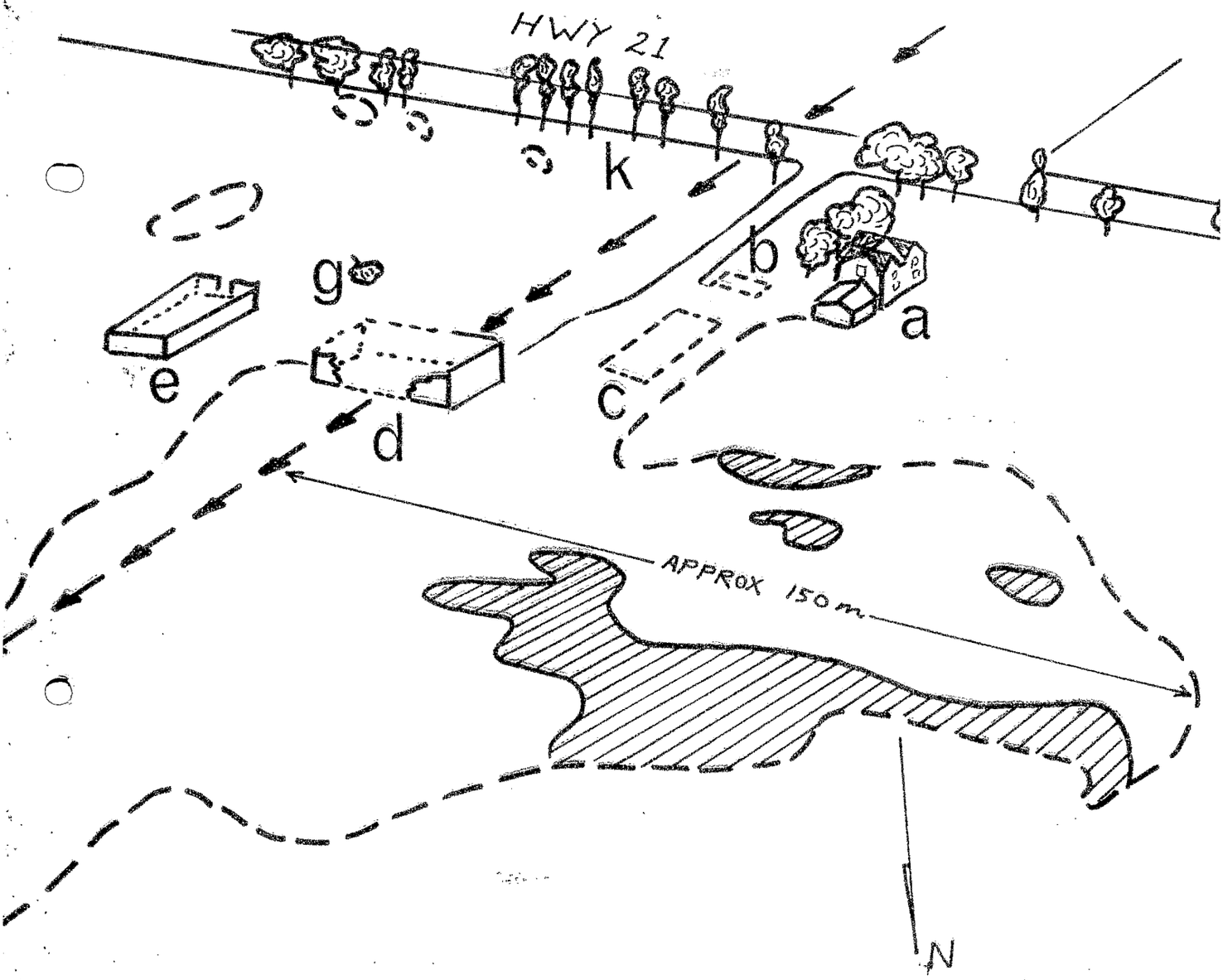



Fig 2 reproduced from an aerial photograph.

a. Dennis Todd's farmhouse. Windows broken on the east side and the building shifted slightly off its foundation.
b. Site of a frame outbuilding. Debris blown against the east side of the farmhouse.
c. Site of a frame outbuilding clad with sheet metal. The building completely disappeared and a tractor inside was turned upside down.
d. Badly wrecked 18 x 24m barn.
e. Concrete barn foundation. The top completely disappeared.
g. Uprooted tree lying with its crown towards the northwest.
k. A length of wire fencing wrapped several times around a tree and the remainder strung out parallel to the path of the tornado.

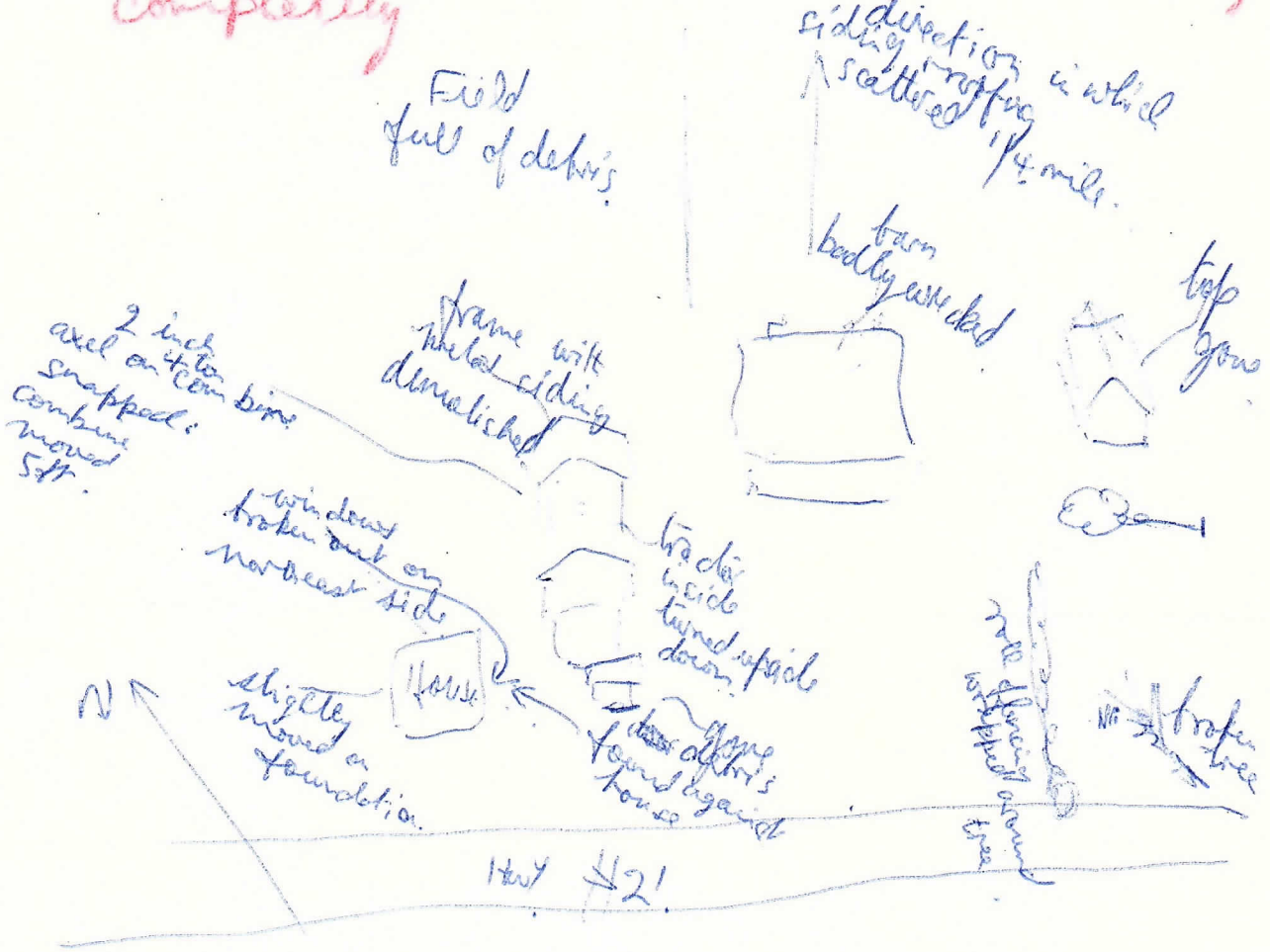
Envelope of debris distribution.

Areas of the most concentrated debris.

Estimated tornado track (exact path unknown).

Gerry McClard pitch

7.36 – 7.40 pm. Dennis Todd. Farm.
60 x 80 barn badly damaged and shifted off its foundation. A number of outbuildings completely




300 - 400 ft wide.

Current Plant

trailer smashed roofing.