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Damages resulting from floods have been on the increase in the past few years. The authors of this article state that one of the main reasons for this is the fact that municipalities have been moving into flood plain basins without the necessary precautionary measures. Thus the authors emphasize the need for better land use planning and provide some model ordinances that have produced positive results.

SUGGESTIONS FOR A MODEL FLOOD PLAIN ZONING ORDINANCE†

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NEED FOR FLOOD PLAIN CONTROL

THE prevention of floods has been a dream of man since time began. Only by the prevention of floods can the villages and cities of America be secure and her fertile valleys be farmed. Before people came to settle there were few flood damages. The river carved its valleys and the nomadic peoples moved to higher lands. Today, however, these valleys are thickly populated with both people and their works of improvement.

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In 1900, annual flood damage in the United States was about $100 million; in 1968 it was about $1.7 billion.[1] The increase is not due to a greater number of floods but to increased encroachment of flood plains. It has been estimated that for every six dollars spent by the federal government on flood protection, five dollars is spent by the general public expanding onto the flood plains. The expansion results from (1) ignorance that the area is subject to flooding, (2) failure of developers to warn prospective buyers of land that may be flooded, (3) the tendency of people to prefer living and working conditions on level bottom lands and (4) the higher value of flood plains and hence the source of higher tax revenues (than in many hilly and mountainous areas).[2]

The federal government, referring to the "general welfare" clause of the constitution, allocated in excess of $7,000,000,000 between 1936 and 1962 for flood prevention.[3] Current estimates of annual expenditure for flood control projects purportedly exceed $500 million and annual flood losses are approaching $1 billion.[4] The damages each year are greater than the year before.[5] One might assume from this that at the present rate of construction of flood protection works the effort would never be complete. This is true only if we fail now to provide for the future. Of the increase in flood damages, 45 percent has been attributed to the increase in property values, 25 percent to an increase in the amount of flooding and 30 percent to an increase in building and other uses of flood hazard lands.[6]

"The problem," according to Professor Gilbert F. White of the University of Chicago, "is that more and more people have been moving into the flood hazard area.

1. WATER RESOURCES COUNCIL BULL. (Sept. 5, 1969).
2. *Id.*
3. NEBR. FLOOD PLAIN MANAGEMENT REG., at 2 (1967), and TENNESSEE VALLEY AUTHORITY, FLOOD DAMAGE PREVENTION, AN INDEXED BIBLIOGRAPHY (5th ed. 1967).
4. HOUSE COMM. OF PUBLIC WORKS, TASK FORCE ON FEDERAL FLOOD CONTROL POLICY, REPORT ON A UNIFIED NAT'L PROGRAM FOR MANAGING FLOOD CONTROL LOSSES, H. R. DOC. NO. 465, 89th Cong., 2d Sess. 1966.
5. *Id.*
6. U. S. ARMY CORPS OF ENGINEERS, ALASKA DIST., FLOOD PLAIN MANAGEMENT REG. & NEBR. FLOOD PLAIN MANAGEMENT REG., at 2 (1967) [hereinafter cited as FLOOD REG.].

So damage potential keeps going up. The flood-control projects themselves are one factor." White thinks that in many cases they breed a false sense of security and this is compounded he feels by inadequate efforts to inform people concerning actual flood hazards. Highway programs constitute the second major factor. New highways have been constructed without reference to flood control, according to White. They have tended to lure business and industry into the flood zones by following the low gradients of stream valleys.[7]

Because flood control through protective works cannot physically nor economically eliminate the flood damage potential, flood damages will remain a problem so long as flood plains continue to be occupied by man. Continued subsidies, in the area of flood plain occupancy, will further encourage a greater use of the flood plains than would be justified by the strict application of economics. It hardly seems necessary that every year some 75,000 Americans are driven from their homes by floods and, on the average, 80 persons are killed each year. These destructive overflows have caused property damage in some years estimated at more than $1,000,000,000.[8] Floods also waste great amounts of water and water is a priceless national resource.

A PLAN OF ACTION

Unilateral decisions and actions can no longer provide acceptable answers to these problems. Each level of government and the individual have a role. The federal interest is unquestioned. State and local governments and individual owners of properties in flood plains also must meet their responsibility if there is to be improved management.

Total control of flood waters by impoundment is often assumed by the layman to be the only method of flood prevention. However, this viewpoint is not tenable from an economic viewpoint.[9] Dams, reservoirs, flood walls, channel

7. Chicago Sun Times, May 16, 1967, § 2, at 1.
8. U. S. ENVIRONMENTAL SCIENCE SERVICE ADMINISTRATION, PUB. NO. ESSA-P1, 660030, FLOODS AND FLOOD WARNINGS (1966).
9. FLOOD REG., *supra* note 6, at 3.

improvements and other protective flood control devices are costly, so the flood damage must be large to justify economically these improvements.[10] For the most part, these flood control devices are expensive and are never completely effective; thus the flood damage potential often remains. The public's complete faith in the public works results in increased construction in the flood plain due to the flatness of the land near cheap water transportation and the ease of construction.[11] It has been estimated that in the United States the flood plains of the rivers and streams amount to 6 percent of the total land area.[12] Yet almost all urban developments of any size involve the development of the flood plain of rivers or streams.[13] The public engages in this construction with little realization that damage has been reduced by flood control devices, not eliminated.

As rapid urbanization creates greater amounts of runoff and the construction of additional levees and flood walls creates continually higher flood stages, the problems are compounded. There are other alternatives which in cases offer more equitable and sounder solutions. Land use regulation is one such alternative. Land use regulation for prevention of flood costs is the practice of designating those areas which are susceptible to frequent flooding and limiting their uses to those which will not be seriously damaged or will present a hazard to life if flooded.[14]

Optimum use of the flood plains can be brought about only if those associated with the development and regulations of such land gain the proper perspective and philosophy concerning the task lying before them. Land use regulation should be the major part of a complete program of flood prevention and one which could be put into effect quickly and in-

10. *See* Cooter, *To Stay Out of Floods*, 50 NAT'L CIVIC REV. 534 (1961).
11. *See* DOUGAL, FLOOD PLAIN MANAGEMENT—IOWA'S EXPERIENCE 29 (1969).
12. HOUSE COMM. OF PUBLIC WORKS, TASK FORCE ON FEDERAL FLOOD CONTROL POLICY, REPORT ON A UNIFIED NAT'L PROGRAM FOR MANAGING FLOOD LOSSES, H. R. DOC. NO. 465, 89th Cong., 2d Sess. 1966.
13. IOWA NATURAL RESOURCE COUNCIL, BULL. NO. 1, AN INVENTORY OF WATER RESOURCES AND WATER PROBLEMS, DES MOINES RIVER BASIN (1953); U. S. ARMY ENGINEER DISTRICT, FLOOD PLAIN MANAGEMENT INFORMATION REPORT, DUCK CREEK, SCOTT COUNTY, ROCK ISLAND (1965).
14. *See* FLOOD REG., *supra* note 6, at 3.

expensively to yield the greatest benefits.[15] The damage done by a single flood to a locality could possibly exceed the required state allocation for flood control for many years. Land use regulation by its nature is a forward looking program which will not rectify past errors but can help prevent future mistakes.

The purposes of land use regulation are to: (1) prevent loss of life, (2) prevent the installation of structures which limit the channel capacity and increase flood heights, (3) prevent excessive property damage, (4) protect the public health, (5) reduce public expenditures for emergency operations, evacuations, and restorations, (6) discourage the victimization of unwary land and home buyers by uninformed or unscrupulous sellers, (7) prevent damage to industries, transportation and utility systems, (8) remove the impediment to community growth created by recurrent flooding, and (9) prevent further unwise expansion and development in unprotected flood plains, thus reducing future expenditures for expensive protective measures such as reservoirs, and levees.[16]

Little use has been made in the past of the local authority to zone for protection from floods. This can be attributed to a lack of cognizance on the part of local authorities of both their powers to regulate land use and the desirability of the utilization. The tendency of land use regulations to expose the true value of an area by recognizing the flood hazard discourages land speculation and generates strong opposition to such regulations.[17] Local authorities have had difficulties in withstanding such pressure. They may therefore tend either not to administer the ordinance with diligence by treating the encroachment danger as just another factor in

15. DOUGAL, *supra* note 11, at 131.

16. FLOOD REG., *supra* note 6, at 4.

17. Much more so in flood plain zoning than in zoning as a whole. For unless a disastrous flood is in recent memory, the attitude of the citizenry is that "It will never happen in our lifetime", or "It happened last year and won't come again for another 50 years." The fallacy of this is amply demonstrated by the fact that in 1954-55 four hurricanes (Hazel, Connie, Diane and Ione) hit North Carolina, three of them within a five-week period. The damage in the state was an unprecedented $520,000,000—more than the annual state tax levy. COUNCIL OF CIVIL DEFENSE, NORTH CAROLINA HURRICANE PROJECT 21 (1955).

considering a permit, or be prone to grant variances, or fail to have an ordinance with teeth in it passed in the first place. The provision for ultimate responsibility at the state level would enable more uniform application of land use regulations. Many communities may even be hostile to the adoption of land use regulations on the premise that it is an infringement on the right of any individual to exercise free choice in the use of his property. This view neglects the harmful effects that improper land uses may have on adjoining or neighboring property. It also overlooks the vast amount of general tax dollars expended annually in flood fighting, flood relief, and structural flood control. Since streams may pass through many areas of differing local jurisdiction a coordinated approach is required to obtain information and equitable regulations.

It is of most importance that a county or watershed zoning plan be adopted. The real contribution which the regional approach makes is to coordinate the efforts of local jurisdictions within each of the respective regions along the river. In populated urban areas the need for regional planning is critical due to the amount of construction in the flood plain. Construction of various works in the flood plain may unduly restrict the flood discharge, causing an increase in flood stages and attendant flood damages. For example, flood profile studies which have been completed at Cedar Rapids and Waterloo, Iowa, clearly indicate the effect caused by constrictions in the flood plain.[18] Flood stages during severe floods can be two to four feet higher in the upstream reaches of urban areas as compared to the flood stages which would be experienced in the unrestricted rural reaches of the river. Because of the interrelationship of man's works and floods, one upon the other, careful and detailed planning of the entire river basin is necessary if optimum use of the flood plain is to be achieved.[19]

Before entering into the writing of a Model Flood Zon-

18. SCHWOB, CEDAR RAPIDS BASIN FLOODS (Iowa Highway Research Bull. No. 37, 1963); U. S. ARMY ENGINEER DIST., FLOOD PLAIN INFORMATION REPORT, CEDAR RIVER, LINN COUNTY, ROCK ISLAND (1967).

19. *See generally* CHOW, HANDBOOK OF HYDROLOGY 110-113 (1964); LINSLEY, KOHLER & PAULHUS, APPLIED HYDROLOGY 230-235 (1964).

ing Ordinance, consideration must be given to the state enabling legislation which is necessary to provide the municipality with authority to zone (unless of course the authority is given in another way, such as by the state constitution). For any zoning ordinance to be valid it must fall within the powers and purposes contemplated by enabling act.

The local government unit will generally be authorized by an enabling act to regulate land use for the purpose of promoting the health, safety, morals, or general welfare of the community.[20] The critical question to be resolved will be whether the flood plain zoning may be interpreted to fall within the power clause of that government's enabling act. The three public policy objectives commonly given for flood plain use regulation include (1) the prevention of individual choice which result in land use obstructing flow so as to cause damage to others; (2) the protection of individuals, who do not know a flood danger exists, from irrational choices of land use leading to loss of health, safety, or property and (3) the prevention of injury to taxpayers by requiring unnecessary expenditures for public works and disaster relief.[21]

The typical general enabling act sets forth some specified purpose in addition to that of promoting general welfare. However, even in its broadest sense, the control and reduction of flood damage, does not seem to fall within any of these specifics. It seems that flood plain zoning can only be justified by relying on the general welfare clause usually found in such enabling acts.[22] The purpose pursuant to promoting the general welfare is the prevention of needless public expenditure for flood compensation losses and engineering works to prevent future losses necessitated by flood plain development. Since flood plain zoning may be difficult to fit within traditional zoning concepts, a strongly urged

20. *See* ADVISORY COMM. ON ZONING, U. S. DEPT. OF COMMERCE, A STANDARD STATE ZONING ENABLING ACT UNDER WHICH MUNICIPALITIES MAY ADAPT ZONING REGULATIONS 1 (rev. ed. 1962). The text is cited in 3 RATHKOPF, THE LAW OF ZONING AND PLANNING 100-1. (1970). *See, e.g.*, ARIZ. REV. STAT. ANN. § 9-461 (1956).

21. Dunham, *Flood Control Via the Police Power*, 107 U. PA. L. REV. 1098, 1108-09 (1959) [hereinafter cited as Dunham].

22. This justification is satisfastory only "if the courts read the enabling act as almost a general grant of police power over land use, rather than a narrow grant." Dunham *supra* note 21, at 1119.

alternative to relying on the welfare clause is amending the enabling act by adding the words "to lessen the financial burden on the public due to floods."[23]

In Iowa, for example, there appeared to be ample authority for flood plain zoning yet the enabling statute was amended.[24] The Iowa Code provides that for zoning purposes a municipality may be divided into districts,[25] and that zoning regulations may be prescribed for each district so established.[26] As to regulations within districts, inquiry into the policy grounds of flood plain zoning is unnecessary; health, safety, economic loss are rendered permissible by the statute. The legislature however, in a 1965 amendment,[27] added "safety from ... floods" to the list of valid regulatory purposes, and it is now very clear that regulations within districts may be aimed at minimizing flood hazard.

Though the constitutionality of zoning has long been established[28] the legal precedent for flood plain zoning is sparse.[29] The determinative factors of the constitutionality of flood plain zoning are the enabling act, the zoning ordinance, and the practical application of such an ordinance. For the zoning ordinance to be constitutional it must not infringe upon the guarantees of due process or equal protection. Substantive due process[30] is a broad requirement of reasonableness in legislation. In its various facets, this guarantee demands that legislation (1) be designed to accomplish an end which the enacting authority has a right to achieve, (2) be reasonably calculated to achieve the legitimate end [31] and (3) be reasonable (not arbitrary or capricious) in

23. *Id.* at 1120, citing DU PAGE COUNTY, ILL., ZONING ORDINANCE § 4L (1957).
24. See IOWA CODE ch. 373 (City Plan Comm.), ch. 414 (Municipal Zoning), ch. 358(A) (County Zoning), ch. 473A (Metropolitan Planning Comm.) (1966).
25. *See* IOWA CODE § 414.3 (1966).
26. *Id.*
27. *Id.* § 414.3.
28. *See* Bettman, *Constitutionality of Zoning*, 37 HARV. L. REV. 834 (1924); McQuillin, *Constitutional Validity of Zoning Under the Police Power*, 11 ST. LOUIS L. REV. 76 (1926); Ribble, *The Due Process Clause as a Limitation on Municipal Discretion in Zoning Legislation*, 16 VA. L. REV. 689 (1930).
29. *See* Dunham *supra* note 21, at 1132; White, *State Regulation of Flood Plain Use*, 16 J. LAND & P. U. ECON. 356 (1940).
30. U. S. CONST. amend. XIV, § 1.
31. A zoning ordinance will be set aside as confiscatory when it is shown the property to which it applies is not reasonably adapted to the permitted use

relation to the legitimate end.[32] Thus for the purpose of flood plain regulation, the due process concept will focus inquiry upon the allowable policy grounds of the regulation, the probability that the regulatory scheme will achieve the allowable goal and the reasonableness of the regulatory scheme. The equal protection concept requires that statutory classification be reasonably related to the end sought to be achieved.[33] The guarantee of equal protection requires that the law be applied so that persons similarly situated must be similarly treated.[34]

Only after consideration of all the factors previously discussed can an effective, damage-reducing ordinance be drafted. The ordinance must be drafted with sufficient breadth to accomplish its purposes, with clarity and with defined basic policy objectives which, when applied, will withstand the test of reasonableness. A discussion of the text of the flood plain zoning ordinance, set out at the end of the article follows.

It should be clear from the text of the ordinance that it is proposed as an amendment to the existing zoning plan. No special provision is made for a Board of Appeals, procedure, and the like. This is not deemed necessary as it would not conform to the existing zoning administration which would add to confusion and impede its passage.

Section 1 should set forth the purposes of the ordinance. These have already been discussed above in connection with the enabling act. In most states this would mean that the statute should set forth the purpose of promoting the health, safety, morals, or general welfare of the community[35] from

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or uses. *See, e.g.*, O'Connor v. City of Moscow, 69 Idaho 37, 202 P.2d 401 (1949); Bassey v. City of Huntington Woods, 344 Mich. 701, 74 N.W.2d 897 (1956); Vernon Park Realty, Inc., v. City of Mt. Vernon, 307 N.Y. 493, 121 N.E 2d 517 (1954).

32. Village of Euclid v. Ambler Realty Co., 272 U.S. 365, 389 (1926). *See, e.g.*, City of Champaign v. Roseman, 15 Ill.2d 363, 155 N.E.2d 34 (1958); Lamarre v. Commissioner of Pub. Works, 324 Mass. 542, 87 N.E.2d 211 (1949); City of Toledo v. Miller, 106 Ohio App. 290, 154 N.E.2d 169 (1957).

33. U. S. CONST. amend XIV, § 1.

34. *See, e.g.*, Yick WO v. Hopkins, 118 U.S. 356 (1886); Ronda Realty Corp. v. Lawton, 414 Ill. 313, 111 N.E.2d 310 (1953); Katobimar Realty Co. v. Webster, 20 N.J. 114, 118 A.2d 824 (1955).

35. *See* IOWA CODE § 414.1 (1966).

the menace of floods.[36] The broader the grounds upon which the zoning regulations can be administered are, the more comprehensive the plan can be. Absent such a purpose section, the reasonableness of both the purpose and the application of the ordinance becomes entirely dependent upon judicial construction. Conversely, a legislative declaration of purpose should enjoy the presumption of constitutionality and ease the way of the ordinance if it faces a court challenge.[37]

A purpose section might also include the purpose of lessening the financial burdens imposed upon the community by rescue and relief efforts occasioned by the occupancy of such flood areas, and to minimize the danger to life and property which results from development undertaken without full realization of such danger. However the section must include more than just the last purpose, the danger of life and property which results from development undertaken without full realization of danger, for if it does not, a court might find that if an owner took certain precautions he could not be regulated, e.g., if he put notice in the deed, signs on the premises, or the like. The point is that a multipurpose regulation will more readily be sustained than one whose justification must rest on a single phrase.

The general scheme of zoning ordinances is that two or three restricted districts are set up. Superimposed on the regular zoning districts of the municipality, with the nature of the uses permitted in those districts varying, for the most part, according to risk. The most often used method is that of two restricted districts based on an analysis of flood data available for the region. New Jersey, for example, delineates in the following manner: the flood hazard area is the initial step to develop the factual basis for further action. The flood hazard area has been divided into two parts. The *floodway* carries the substantial portion of the flood flow at

36. *Id.* § 414.3.

37. A majority of the ordinances in effect have purpose clauses ranging from one phrase, *see* CALVERT CITY, KY., ZONING ORDINANCE § 4 (1953) ("Due to the hazard of looding . . ."), to those which are more extensive yet somewhat ambiguous. *See, e.g.*, Cincinnati, Ohio, Proposed Provisions Zoning Ordinances (1958): "To protect human life, prevent or minimize material losses, and reduce the cost to the public of reserve and relief efforts occasioned by the unwise occupancy of such flood areas."

greater depths and velocities and the *flood hazard area* is the landward region which is inundated but to lesser depths and with lower velocities.[38] Careful consideration has been given to developing criteria and procedures providing uniform standards for the delineation of flood hazard areas throughout the state of New Jersey.[39]

Dissemination of information concerning the flood hazard areas, the flood damage problem and suggested alternatives are extremely important to guide and influence many individuals, organizations and agencies planning for the future. Planning is an essential element in our society but wise planning alone, though recommending proper use of flood hazard areas, can not effectively stop the growth of flood damages. The plan must be implemented with regulations.

While considerable information concerning flood hazard areas has been available for many years, progress in most areas of the nation has been hampered by an inability to present the problem in simple layman language to the individuals, officials and engineers directly concerned with flood plain development and to provide understandable technical data that are meaningful and readily available for use.[40]

In New Jersey, therefore, major emphasis is being given to a program to educate the public to the flood plain hazard problems through the use of graphics and basic non-technical narrative material in report, slide, and poster form. This appears to be awakening a new and long overdue consciousness of the problem. New Jersey feels that in view of the importance of the flood plains of their state to their interrelated water and land use planning, that the topographic mapping program which accurately defines the limits of flood prone areas, while costly, is warranted.[41]

The flood hazard map and profile indicate the most

38. Address by Robert E. Cuphew, Jr., American Society of Engineers Annual Meeting and National Meeting on Water Resource Engineering, New York, N.Y., Oct. 16-20, 1967.
39. *Id.*
40. *Id.*
41. *Id.*

essential element of their statewide program as it provides the necessary factual information as to the extent of the flood hazard along any reach of river. It is developed in three steps: (1) Determination of the design discharge for the floodway and flood area limits; (2) determination of the water surface elevations associated with each design discharge; (3) relating the water surface elevations to the ground elevations to determine the respective areas flooded.[42] The flood hazard maps are used as a technical basis for regulating the permissible types of development. It is essential, therefore, that the maps be accurate and made to an enlarged scale for clearly delineating the areas flooded.

Prime consideration must be given to determine the relative size or magnitude of the respective floods for delineating the flood hazard area. It is absolutely essential that their magnitude be "reasonable—neither too high so as to impose an unduely restrictive limitation—not too low so as to be ineffectual in reducing flood damages."[43]

The delineation of a flood plain and the determination of floodway requirements and boundaries are technical tasks that involve studies of past and probable future flood flows, characteristics of the floodway and possible modifications of the floodway. A standard used for determination of the flood plain in some ordinances such as St. Louis county is the "highest flood of record."[44] The highest flood of record is the maximum flood that has occurred during the period for which stream flow or stage records are available and also represents a recorded historical fact. Such a flood, however, is a poor discharge upon which to base the delineation of the flood plain. Obviously, the severity of the flood could depend entirely upon the length of the period of record and the probability of its reoccurrence would vary widely from one stream to another. Furthermore, there are thousands of cities on streams on which there is no local record and for that matter there are thousands of small streams on which no flood measurement has ever been made. Hence the "flood

42. *Id.*
43. *See supra* note 18.
44. *See* ST. LOUIS COUNTY, MO., ZONING ORDINANCE § 7 (1958).

of record," if known, would vary widely in the probability of its occurrence. It is entirely possible that in one situation it might be equalled every ten years, on the average, while in another it could not be expected to happen more often than once in two centuries.

A more consistent approach is to choose a flood whose frequency is quite rare—say once in 100 years, on the average. Of course, a flood frequency of 100 years does not mean that a flood of such magnitude will happen only once in every 100 years. What it does mean is that an analysis of all the hydrologic data indicates that the chances that a flood of such magnitude will occur in any particular year are 100 to 1, i.e., there is a 1% chance of its occurrence in any year. The chances in each year are the same no matter whether the previous flood of such magnitude occurred last year or 200 years ago. Actually, the recurrence of great floods is haphazard. Even though the *average* recurrence interval is 100 years, there is a 1%percent probability that one such flood could be followed by another the next year or, on the other hand, that 460 years could elapse between repetitions.[45] The problem with this sort of analysis is that there may not be a representative "sample" for future probability projections. Even 60 years of data, which is more than is usually available, may not be representative as it might well cover a wet or dry 60-year period.

The choice of a flood frequency, such as 100 years, is arbitrary. However, having made the choice, there is actually great uncertainty in the computed result. There happen to be in present-day use eight different formulas for computing the recurrence interval of a flood.[46] For example, the largest flood to occur in a 60- year period would have the following computed recurrence interval according to these formulas: 60, 61, 86, 87, 91, 96, 108, or 120 years. The U.S.G.S. would use 61 and the Corps of Engineers, 87.

There are also six or more methods used to extrapolate from data in a short record to a long period, for example,

45. LINSLEY, KOHLER & PAULHUS, APPLIED HYDROLOGY (1949).
46. CHOW, HANDBOOK OF HYDROLOGY (1964).

from a 40-year record to the expected 100-year discharge. Again, the different federal agencies have not employed the same method in extending to large recurrence intervals. Some plot the computed frequencies on specially scaled graph paper such as logarithmic or probability paper and extrapolate a line through the known points out to the desired frequency. The data tend to fall along a straight line on one paper or another and thus justify a linear extention to higher frequencies. A different approach is to determine the statistical properties of the available data (mean, standard deviation, and coefficient of skew) and, by assuming that the values are typical of a longer period, compute the discharge to be expected at any given frequency. Unfortunately these approaches also yield quite different results for the same original data. In a study made by the U.S.G.S. in California,[47] the 50-year and 100- year floods as computed by six current methods were compared with the actual records on some thirty streams. While individual stream records varied from the computed by as much as 100%, the mean deviation of one method from another was equally large. Furthermore, some of the methods were consistently high and others low, even when based upon the same data. This unsatisfactory situation led to the recent recommendation by the federal Inter Agency Committee on Hydrology of the general use of the "Log Pearson Type III" method of extrapolation.[48] This is one of those methods which depends upon the statistical properties of the available record on a stream and therefore upon the assumption that the period of record is typical. In view of the recent ruling by H.U.D. that the flood plain will be that land inundated by a "100-year flood," for the establishment of flood insurance premiums and the Interagency recommendation that the aforementioned method be used to determine the magnitude of this flood, much of the uncertainty of choice of method has been removed. However, there will be a disparity of results on different rivers

47. CRUFF & RANTZ, A COMPARISON OF METHODS USED IN FLOOD FREQUENCY STUDIES FOR COASTAL BASINS IN CALIFORNIA (U.S. Geological Survey Water-Supply Paper 1580E, 1965).

48. WATER RESOURCES COUNCIL, BULL. NO. 15, A UNIFORM TECHNIQUE FOR DETERMINING FLOOD FLOW FREQUENCIES 1967.

which can improve only with the gradual accumulation of additional recorded experience.

The T.V.A. uses a *maximum probable flood,* which is a flood of reasonable regional expectancy based on meterological and soil infiltration conditions which have actually occurred in the region, if not in the basin itself. This flood is of a magnitude somewhere between a 50-year and 150-year flood, depending on the circumstances.[49] The Corps of Engineers and other organizations commonly use this approach in estimating the maximum flood to be passed through a reservoir in designing the outlets or relief spillways. In general, the method is rather conservative in that the likelihood that a great storm will fall directly on a river valley at a time when the ground is already saturated (or frozen) is so small that it might appear unreasonable to apply it to flood plain delineation. Whereas the engineer can take no chance that a great earth dam will fail because of too small a spillway, there is not the same obligation to prevent light flooding of all river valley land.

The Iowa Natural Resources Council has found the old method of plotting all flood magnitudes against the areas of the basins to be a useful tool.[50] Each point represents a flood which has occurred, and thus is based on the "flood of record" criterion. However, since floods in all areas are shown (in Iowa from one to 100,000 square miles in area), it is quite apparent that the upper limit of the points is fairly well defined. While this limit has never been approached by many streams, still the fact that it *has* occurred on one stream of a particular size permits the inference that it could happen on another of that size in the same region. The flood magnitude delineated by a line near the top of the group is called the "Regional Flood." It has the merit of actually having happened in the same region and has therefore proved to be a criterion acceptable to layman and courts alike. In making frequency studies the Council has found the Regional Flood to have a recurrence interval somewhat greater than 100 years.

49. DOUGAL, *supra* note 11, at 40.
50. *Id.* at 354.

The region approach is the preferable method,[51] for in the continental type of climate which is characteristic of the midwest, including Iowa, there is no meteorlogical reason why severe storms (or heavy snow cover) cannot occur anywhere within the region. This permits the storm transposition concept to be used.[52] Subject to the approval of a meteorologist, the hydrologist can transpose these recorded storm patterns to other river basins for which the flood potential is desired, and evaluate the magnitude of flood discharge which might occur. As outlined previously, drainage area and other physiographic variables may be correlated to the magnitude of peak discharge. If, however, one uses just the data available in the immediate area, the period of record may be such that the severe storms have always occurred elsewhere in the region, and no unusual flood will have been experienced.

Another approach to the flood to be used in delineating the flood plain is to use a multiple of the mean annual flood. The average of the greatest floods of each year tends to be a fairly stable figure after two or three decades and yet is a fairly good measure of the river's potential flood capability. The multiple to be used is a judgment factor but values from 5 to 7 are in use in some eastern states.

The precise amount of flood data necessary for any districting to be done cannot be specified for any particular case. The lower the frequency of flooding, the more precise the calculations will be. The size of a 10-year flood from a fairly short record may not differ greatly from the size of a 10-year flood derived from a long record. And these are the estimates of greatest interest to the community. For a 100-

51. The regional method is described by the following: "The greatest obstacle to the accurate definition of the flood frequency graph at a gaging station is the shortness of record—a deficiency that can be corrected only by the collection of additional records in future years. Thus, some future analytical device is necessary if more dependable information is to be extracted from flood records available at the present time. One artifice commonly and profitably used in such circumstances in the combining of records (or a certain region) on the premise that the average answer . . . from all . . . is more reliable than any single one . . . . By combining records on the basis of geometric similarity of the frequency graphs, regions may be defined in which the shape of the frequency graph common to all streams can be closely determined." PIERCE, FLOODS IN ALABAMA—MAGNITUDE AND FREQUENCY 10 (U.S. Geological Survey Cir. No. 342, 1954).

52. CHOW, HANDBOOK OF APPLIED HYDROLOGY (1964).

year flood the percentage difference can be much larger. The less frequent (*i.e.*, the larger) a flood, the less likely it is that the frequency assigned to it will constitute a close approximation to the frequency which a long subsequent record might reveal. It should be pointed out that ordinarily very large floods extend to the base of the hills bordering the valley, and that for this reason the location of the flow line (*i.e.*, the outer limits of the areas inundated by the flood for the maximum probable flood) may shift relatively little for large changes in the size of the flood. For small floods, however, a small error in the estimate of the flood discharge can make a large error in the area flooded.

It is quite evident the flood data calculations are too difficult for the local authorities to do themselves. The desired technical information can best be collected and prepared as flood plain information by a federal agency such as the U.S. Corps of Engineers.[53] In addition, where possible, a cooperative cost sharing agreement with the U.S. Geological Survey should be made to help delineate in detail the flood plains of streams and river basins.[54] The Geological Survey is currently engaged in the preparation of flood frequency reports by drainage basins which will cover the entire United States; reports covering parts of most all of the states are available.

The suggested method for districting of the flood plain is set out in Section 2. The most restricted, or Floodway, district has the hydraulic capacity to convey a flood having a chosen frequency, such, for example, as 50 or 100 years. The maximum probable flood (or maximum flood of reasonable

53. The Corps of Engineers has been specifically authorized by the Flood Control Act of 1960: "To compile and disseminate information on floods and flood damages, including identification of areas subject to inundation by floods of various magnitudes and frequencies, and general criteria for guidance in the use of flood plain areas; and to provide engineering advice to local interests for their use in planning to ameliorate the flood hazard . . ." 33 U.S.C. § 709(a) (1964).

54. A community desiring to have a flood-frequency study made should make known to the District Office of the Geological Survey its need and interest in cooperatively sponsoring such a study. The Geological Survey would then prepare a work plan to determine the amount of work involved, the time required to make the study, and the cost. If this work plan should be accepted by the community, [an] agreement would then be drawn up . . . . Projects costs, which are normally assumed on a 50-50 cost sharing basis, contingent on availability of federal funds for matching, depend upon the amount of work required for a specific project.

regional expectancy as it is also called) is the basis for the flood plain district. It is the flood of reasonable regional expectancy based on one of the methods heretofore described. Larger floods than it are possible but the factors necessary to produce them would occur at extremely rare intervals; for this reason they usually need not be given the most significant consideration in flood plain zoning. The extreme flood should not be used also for the practical reason that the local communities do not feel justified in basing on the extreme flood and will not put such an ordinance into effect.[55]

Difficulty may be anticipated if the recorded historical evidence of flooding shows little correlation to the frequency data, although logically it should not. And of course special provision might have to be made if protective works such as levees exist. These may give protection against only a 25- or 50-year flood, and yet if they are overtopped, the results can be more disastrous, because of reliance on them, than if they did not exist. In fact, it seems that from legal viewpoint, they present a dilemma. If a levee exists which protects against a 25-year flood it is unreasonable to restrict the land behind it by zoning for a flood of that magnitude; yet the zoning restrictions for a 50-year flood frequency area will probably be less restrictive than for a 25-year flood zone. But once the levee is overtopped, the structures in that zone suffer the effects of being in a 25-year flood zone rather than in a 50-year flood zone.

It is not suggested that the precise frequency scheme of the model ordinance will be appropriate for every community. Depending on the extent and type of development and the distances between districts, it may be desired to have a different magnitude of flood. In fact, the state agency concerned may require different criteria. What is suggested is a method for flood plain districting.[56]

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55. DOUGAL, *supra* note 11, at 354.

56. Part of this "method", of course, is the use of precise frequency standards indicating the degree of risk. MURPHY, REGULATING FLOOD PLAIN DEVELOPMENT 56-59 (U. of Chicago, Dept. of Geo. Research Paper No. 56, 1968). "If available criteria are lacking, the tendency is to minimize or disregard a flood problem. Those who do attempt to assess this problem . . . usually use the flood of record as a basis for such determination." *Id.* at 130.

Section 3 provides for reconsideration of the location of district lines on a showing that protective work has altered the flood hazard or that the flood data upon which the district lines were originally based led to an incorrect conclusion in the light of more recent experience. Protective work will affect the legal basis or previously located district lines since the danger of a flood will have been decreased or, for practical purposes, eliminated. This provision permits ready alteration in such an event.

Section 4 suggests a scheme of uses to be permitted on the flood plain. The use section, more than any other, may be tailored to the needs of a particular locality. The approach taken here is that of basing all use-regulations upon the same factors which control the rest of the scheme: sound engineering principles. The uses basically suggested here are, for the floodway district, uses which will not sustain heavy damage in the event of flood. This is the scope of section 4.1 (b) to (f). Section 4.1 (h) reflects the policy that no residences at all should be in the high risk area of the flood plain. This is the only departure from restriction based on principles of engineering. Such a prohibition is suggested because of the extreme dangers involved. Of any classification, this one would seem least likely to violate the requirement of equal protection.

The structures that will be permitted on the flood plain (except those of minimal value, such as fruit stands) should be subject to special floodproofing provisions contained in the building code. Because of such factors as the expected velocity of the water and slope of the land which vary substantially between communities, a code section was not drafted here. All codes should have certain basic requirements, such as that any structure be built in such a manner that the danger that it will float from its foundation will be eliminated. Provisions against floatation should also be made for large outdoor storage tanks and fuel tanks, for if the contents are inflammable, a fire hazard would be caused. Furthermore, they would also become floodway obstructions if they are carried against a bridge, for example, and block

passage of the water. Less pressing flood-proofing provisions are flood-doors and gates, water tight basement window fittings, sturdy and waterproof foundations and electrical pipelines and sewers, and installation of check valves and pumps.

On the basis of the nature of the flood plain, decisions must also be made as to whether to prohibit basements altogether, or to require that the first main floor of the structure be of a height at least equal to the flowline of a flood of a specified magnitude, or both. Habitable buildings with or without basements should not be permitted in the floodway because of the danger to human life. In the Flood Plain district basements might be permitted,[57] but the first floor might be required to be a foot above the flow line of the maximum probable flood and to have check valves in sewer or drainage pipes; this might be qualified as to residential structures to the effect that it be the lowest floor designed for human habitation including the basement if the structure is so designed. Also, should any structure be permitted by the department to be erected in the floodway it must not significantly block the passage of the design discharge; particularly strict requirements may be imposed in the Building Code in order to give greater assurance that if a structure is permitted that it be able to withstand the lateral force of a high velocity current.

Some municipalities have put these basement and use requirements directly in the flood plain zoning ordinance,[58] but the reason may well have been that it had no Building Code in force since that would have been the proper place. The important thing is that they be provided for somewhere.

The combination of Sections 4.1(h) and 4.2(c) results in

57. It should be noted, however, that when a structure is built on a pile foundation (as may often be the result if basements are prohibited, either with or without a height requirement), it is more subject than other types of foundation to being undermined by swift currents and to settling into saturated ground. It will cause increased danger, since the occupants will tend to remain, feeling safe therein. HOYT & LANGHEIN, FLOODS 102 (1954).

58. *See* KNOXVILLE, TENN., ZONING ORDINANCE (1963); MUNSEY, KENTUCKY. ZONING ORDINANCE (1963); AVON, CONN., ZONING ORDINANCE (1963); PRINCE GEORGE COUNTY, MD., ZONING ORDINANCE (1967); RICHLAND, ORE., ZONING ORDINANCE (1964).

barring from any part of the flood plain institutional structures designed for those who, by reason of age, health, or imprisonment, may lack the ability to escape from flood waters. While this problem may not exist very often with schools, undesirable structures such as prisons seem habitually to be relegated to the least desirable location in the community—generally the river front.[59]

Sections 4.1 (g) and 4.2 (b) provide that, if appropriately constructed to avoid flood dosses, all nonresidential uses will be permitted in the flood plain district, and structures will be approved for the floodway district if the nature of the industry requires a water front location, or the use to be carried on in them is such that the contents of the structure can be quickly evacuated in time of flood.[60] It is to be remembered of course that all these suggested uses are subject to the other provisions of the city zoning ordinance, to any building regulations, and to the state encroachment law.

It might be argued that such provisions for different uses violate the equal protection of the laws guaranteed by the 14th Amendment. This is not thought to be a sound view since each distinction made is believed to have a rational basis. The greater restriction imposed on residential uses rests on the belief that generally a homeowner is less experienced and less careful when he buys a home than a businessman, and that he is not able financially to absorb a flood loss as well as a businessman can. The distinction between permitting residences in the Flood Plain district if they meet building code requirements but prohibiting them for the Floodway district may rest both on the greater risk and the fact that the height from the ground which the residence would have to be built would be substantially more in the Floodway than in the Flood Plain district. As to permitting only certain nonresidential structures in the Floodway area,

59. Another factor in the location of prisons near the river is, of course, that the community first settled there, and the present city jail is still the original building or was rebuilt on the same location. The LOS ANGELES COUNTY, CAL., ZONING ORDINANCE art. 4, § 444 (1957) has a similar provision, but, significantly, it does not extend to places of incarceration.

60. This assumes that an effective evacuation of the goods can be accomplished before the flood waters have risen too high. This would have to be indicated by an interpretation of flood data.

but permitting all nonresidential use in the Flood Plain district, one must examine the nature of the uses permitted in the Floodway district. The roadside fruit stand type should not present difficulty since its destruction will not cause substantial property loss and its obstruction of the channel is not significant. Permitting structures which are to contain animals or readily movable equipment such as trucks is based upon the assumption that these contents will be removed in case of flood, leaving little more than the "shell" of the building. Since it is presumed that a structure which can withstand the force of the flood has been required, little loss should occur. And a use which requires a river location should be upheld since it is precisely this type of use which will probably be granted a variance if the Ordinance does not specifically permit it. Since a variance does not violate equal protection of the laws, providing for the same situation explicitly should not.[61]

Some may argue that the restriction and standards suggested are not as high as they ought to be. But one must remember that this type or regulation will evoke strenuous local opposition unless the flood plain area in question has not been and is not expected to be developed[62] for it attempts to plan for floods which many will feel can not happen, unless the ordinance is being proposed immediately after a disastrous flood. The model ordinance is one which, as to severity of restriction, should have a realistic chance of being adopted in a nondisaster atmosphere.

Article 5 merely explicitly imposes on an applicant the duty to prove, on request of the Board, required structural and other facts as to such matters as the danger that the structure will float from its foundation during a flood. Of course references to the "Board of Adjustment" or other agencies simply means the appropriate agency or person for the task at hand. This will vary with the municipal structure.

61. For an analogous situation, *see* Thomas v. Zoning Bd. of Review of the Town of Bristol, 84 R.I. 330, 124 A.2d 859 (1956).

62. Indication of this is found in MURPHY, REGULATING FLOOD PLAIN DEVELOPMENT 81-82 (U. of Chicago Dept. of Geo. Research Paper No. 56, 1968) where the author reports that 98% of the land covered by flood plain zoning is undeveloped and used mainly for pasture and agriculture. In the vast

Article 6 deals with nonconforming uses which draftsman of model regulations have often excluded. The rationale of their approach is the (1) nonconforming uses are more conveniently handled in the community's land-use regulations of general application, and (2) that the nonconforming use issue raises political opposition which may foreclose the enactment of any flood plain regulations. It is suggested that these objections are unsound. First, the reasonableness of restrictions on property is a function of hazard and necessity. The strong policy grounds of flood plain regulation require a nonconforming use provision which is tailored to the statutory goals. Second, control of preexisting uses is an urgent goal of regulation. Future development of the flood plain is of higher importance, but it is out of existing uses that there arise the most presently grave threats to community health, safety, and economy. If the nonconforming use provision generates political opposition, then that battle is nonetheless preferable to flood plain regulation which is an empty letter.

Generally, zoning ordinances provide that nonconforming use will be prohibited if it has been abandoned for a certain period or if it has been substantially (60%) destroyed. The model ordinance allows repairs after up to 70% of the fair sales value of the building immediately prior to damage has been destroyed. This is more lenient than the average but is coupled with a provision requiring all buildings to conform within 25 years of the adoption of the ordinance. Therefore after the ordinance has been effect a few years, partially destroyed buildings will probably not be repaired. Construction must begin within one year and a nonconforming use may not be replaced by another nonconforming use. For the most part such regulations have been upheld,[63] as the adopting municipality has so provided in order to eventually bring all uses in the designated districts into conformity with the comprehensive zoning plan.

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majority of ordinances, an area that has been flooded but had appreciable development on it was excluded from the flood zone district.

63. *See generally*, 58 AM. JUR. ZONING §§ 153 (abandonment), 156 (repair), 158 (extension), 162 (replacement) (1948); 1 ZOKELY, ZONING LAW AND PRACTICE §§ 149-58 (2d ed. 1953).

A serious difficulty exists if the municipality should desire to require the removal of nonconforming uses. To require immediate cessation of a nonconforming use otherwise lawful would probably be unconstitutional.[64] This is the reason for the proposal that the use be amortized over a period of 25 years; that is, that a reasonable period of time is given for its removal. Where such amortization provisions have been enacted and it is not in conflict with the enabling act, state courts have split sharply over the issue of its constitutionality.[65]

It is evident that special danger to life and property exists in the floodway. In such cases, they are obstructions or public nuisances, and therefore should fall within the constitutionality of the act. In this sense, the nonconforming use article can be called the "core" of flood plain regulation. Admittedly, some nonconforming uses in the floodway will not be obstructions but it is felt that these will be few since the term can probably include most structures which are not specially built.

An alternative method of amortization of nonconforming use may be more desirable and is as follows: That one year's time be given for each $2,000 or major fraction thereof of value of the nonconforming use, the valuation being determined by the property tax rolls, with the owner being given a limited time to petition the tax assessor for a new valuation (as of a date prior to the ordinance so that its effect will not be to lessen the valuation).[66] The advantage of the right to

64. 1 ZOKELY, ZONING LAW AND PRACTICE, § 150 (2d ed. 1953).

65. Upholding such an ordinance terminating a nonconforming use are: City of Los Angeles v. Gage, 127 Cal. App. 2d 442, 274 P.2d 34 (1954) (plumbing business within five years); Standard Oil Co. v. Tallahassee, 183 F.2d 410 (5th Cir. 1950), *cert. den.* 340 U.S. 892 (1950) (gas station within ten years); Spurgeon v. Board of Comm'rs of Shawnee County, 181 Kan. 1008, 317 P.2d 798 (1957) (auto wrecking business within two years, pursuant to KAN. STAT. ANN. § 19-2930 (1964), which provides for "reasonable regulations . . . for the gradual elimination of nonconforming uses."); State *ex rel.* Dema Realty Co. v. McDonald, 168 La. 172, 121 So. 613 (1929), *cert. den.* 280 U.S. 556 (1929) (drugstore within one year); State *ex rel.* Dema Realty Co. v. Jacoby, 168 La. 752, 123 So. 314 (1929) (grocery store within one year); Grant v. Baltimore, 212 Md. 301, 129 A.2d 363 (1957) (billboards within five years); Seattle v. Martin, 54 Wash. 2d 541, 342 P.2d 602 (1959) (automobile repair within one year).

66. The Fernandina, Fla. Zoning Ordinance 119 (1937) provided for the amortization of nonconforming uses based on one year for each $1,000 valuation or major fraction. ELIMINATION OF NONCONFORMING USES 7 (A.S.P.P. Planning Advisory Service Info. Rept. No. 2, 1949).

ask for revaluation is that it will avoid an equal protection argument: that older structures are assessed for less proportionately due to the failure to revalue in inflationary times. And basing the time within which the use must be removed on its value not only seems reasonable but also will cause fairly prompt removal of the structures least able to withstand flood waters. The problem with such a plan is that expensive structures may be allowed to be maintained in the floodway for an almost infinite number of years. Secondly a small new, but rather inexpensive structure, would not be allowed to be maintained for nearly the period of time as either an old or new expensive structure.

SUMMARY

Despite the construction of ambitious protection works, annual flood losses continue to rise and flood plain regulations—directed toward control of property and structures situated within flood plains—become an important mode of municipal land use planning. This model flood zoning ordinance should make it easier for those concerned with comprehensive flood plain management. An ordinance drafted in conformity with these practical and legal considerations can effectuate a significant reduction in flood losses. Flood plain zoning does not have as its objective the elimination of all flood losses, but that of flood loss control. It allows the most appropriate use of the land, by preventing individual occupants and the public from undertaking land use which would augment the potential of future flood damage.

APPENDIX A

FLOOD PLANNING ZONING ORDINANCE AMENDMENT

ARTICLE I: *PURPOSE*

Since certain areas of the city are subject to flood hazard, flood plain zoning districts (F districts) are hereby created in order to protect the public health, to lessen the financial burdens imposed upon the community by rescue and

relief efforts occasioned by the occupancy of such flood areas, and to minimize the danger to life and property which results from development undertaken without full realization of such danger. The zoning regulations and districts as herein set forth are made in accordance with a comprehensive master plan. They are made with reasonable regard to existing conditions, the character of buildings erected in each district, the most desirable use for which the land in each district may be adapted and the conservation of property values throughout the zoning areas.

ARTICLE 2: *DISTRICTS*

There will be the following classes of general districts: (1) Floodway: The channel of a river or stream and those portions of the flood plains adjoining the channels which are reasonably required to efficiently carry the discharge of flood water or flood flow of any river or stream, and on which properties special regulations are necessary for minimum protection of the public health, welfare and safety, and of property and improvements from the hazards and damages resulting from flood waters.

(2) Flood Plain District: The geographic area between the boundary of the floodway district and the flow line of the maximum probable flood. This district classification is intended to be applied to those properties which lie within areas where inundation is caused by overflow and back water which is relatively free of any current, excluding areas within the Floodway district, and so require special regulations for the protection of such properties and their improvements from hazards and damages which may result from flood waters.

(3) Upland District: The geographical area not included within the Floodway district or the Floodplain district; subject to variation to permit reasonable conformity to the layout of streets and to avoid the division of structures by district lines.

ARTICLE 3: *DISTRICT BOUNDARY ALTERATIONS*

The existing location of the district boundaries shall be reconsidered by the city council and appropriate adjustments made upon petition by any ten persons who are listed on the real property tax rolls of the city, upon a showing by such persons that:

(1) a flood control project of the federal, state, county, or city government, or of a private person, has substantially altered the flood hazard or
(2) flood data compiled subsequent to the enactment of this ordinance indicate that the boundaries of the district as shown on the zoning map of the city have been incorrectly located.

Upon such proof, the boundaries of the district shall be relocated so as to maintain conformity with the purpose of the article.

ARTICLE 4: *USES*

Only the following types of uses shall be permitted in the specified district, but just to the extent and under such conditions as they would also be permitted by the zoning ordinance of this city.

1. Floodway District:

(a) Alteration: Hereafter it shall be unlawful to erect, remodel, or alter any permanent structure or to fill in or on any floodway which will adversely affect the efficiency of or unduly restrict the capacity of said floodway. This is deemed to include filling with dirt, gravel, minerals, or other type of waste matter commonly termed as junk, trash, garbage, or offal.

Permitted Uses:

(b) Agricultural uses in the nature of farming, grazing, livestock raising, horticulture, nurseries and forestry.

(c) Recreational uses in the nature of parks, play-

grounds, golf courses and driving ranges, boat landings, docks, picnic grounds, outdoor rifle and skeet shooting ranges, and such transient amusement enterprises as circuses, rides, and shows, or any other open recreation.

(d) Commercial uses in the nature of open pit mining, quarries, sand and gravel pits, stripping of top soil, airport landing strips, commercial swimming pools, land filling, billboards, parking areas, and railroad tracks.

(e) Storage yards for goods which will not be damaged by inundation (but not including inflammable liquids) in the nature of utility cables and scrap metal.

(f) Accessory uses which do not require the building of a structure with over 400 square feet in floor area in the nature of roadside and park stands for the sale of food, fruit and vegetables, fishing bait and boat rental.

(g) Structures whose presence will not significantly block the flood channel.

(1) for such industrial uses whose nature requires location in the Floodway District because of

(i) use of large quantities of untreated water, or

(ii) industrial waste disposal, or

(iii) transportation services not available elsewhere;

(2) for the containment of animals, such as kennels and riding stables;

(3) for the containment of equipment and goods which can be readily moved in time of flood, such as farm equipment and garages for automobiles and trucks;

(h) In no event shall any facility for human habitation, either temporary or permanent, including trailer camps, nor institutions or places of assembly for the mentally or physically ill, the young or the aged, such as a school, nor any place of incarceration, be permitted.

2. Flood Plain District:

(a) All uses permitted in the floodway district.

(b) Structures for all residential and non-residential uses, provided that such structures meet the requirements of Section ..... of the Building Code unless said structure is not over 400 square feet in floor area, and subject also to the restrictions of sub-section (c)

(c) In no event shall any institution or place of assembly for the mentally or physically ill, the young or aged, such as a school, nor any place of incarceration, be permitted.

(d) Filling and regrading of land situated in a flood plain shall be permitted only when said filling and regrading is approved by the plan commission.

3. Upland District:

No restriction on any use is imposed by virtue of this article.

ARTICLE 5: *SUBMISSION OF INFORMATION*

Where, in the opinion of the Board of Adjustment, engineering or other studies are needed to determine the effects of flooding on a proposed structure or use, the Board may require the applicant to submit such information prepared by competent engineers or other technical persons.

ARTICLE 6: *NONCONFORMING USES*

No building or land shall hereafter be used and no building or part thereof shall be erected, moved or altered unless for a use expressly by and in conformity with the regulation

herein specified for the district in which it is located, except as hereinafter provided.

CONTINUANCE OF NONCONFORMING USES

Any structure or use existing at the time of enactment or subsequent amendment of this ordinance, but not in conformity with its provisions may be continued with the following limitations. Any structure or use which does not conform to the provisions of this ordinance or subsequent amendment may not be

(1) Changed to another non-conforming use

(2) Re-established after discontinuance for one year

(3) Extended except in conformity with this ordinance

(4) Rebuilt or repaired after damage exceeding 70 percent of the fair sales value of the building immediately prior to damage.

All nonconforming uses of land shall be discontinued and all nonconforming building or structures shall be torn down, altered, or otherwise made to conform within 25 years from the date of adoption of this ordinance.